NOVEMBER 9, 1953

NEWS ISSUE

Electrical World

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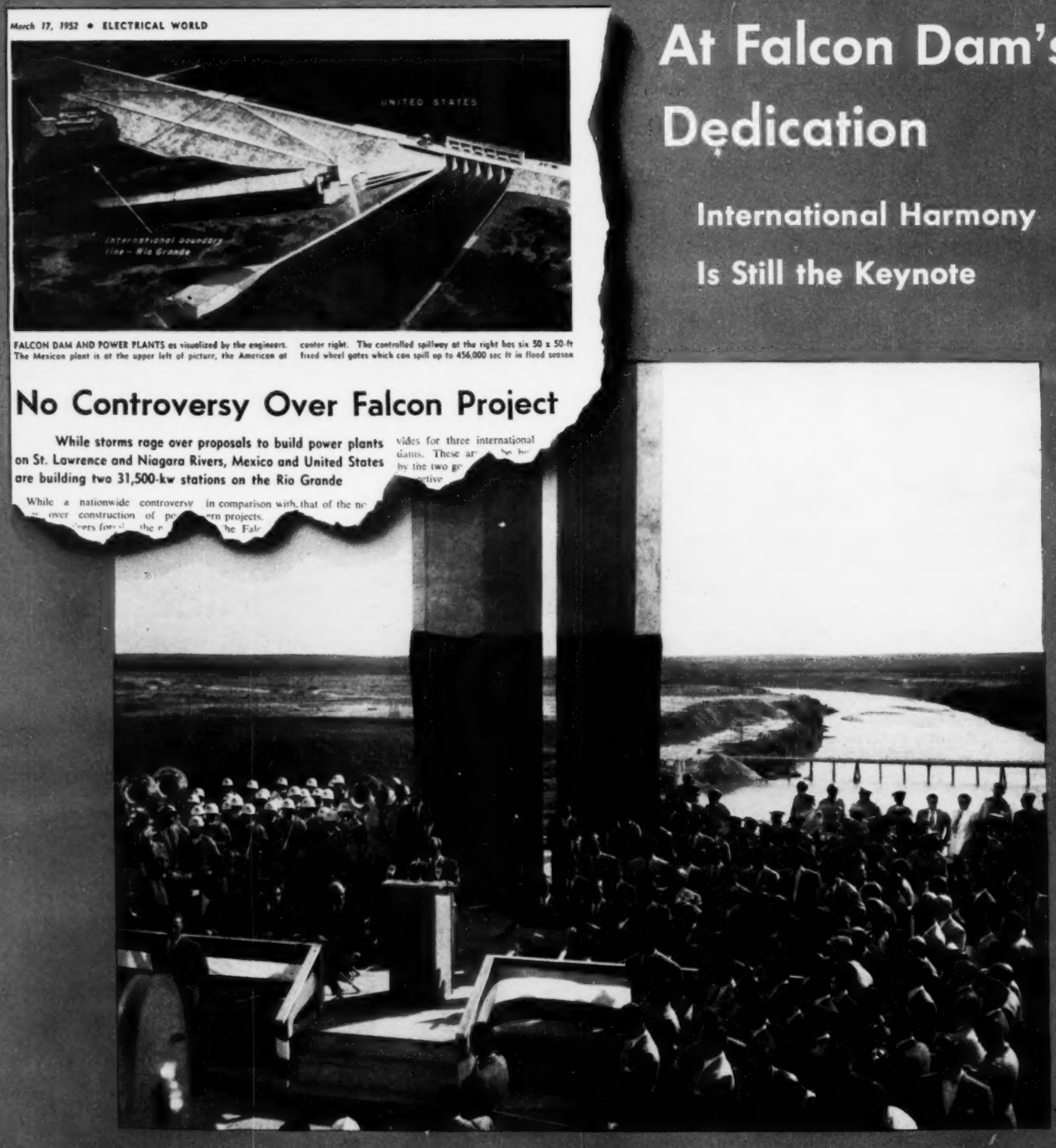
At Falcon Dam's Dedication

International Harmony Is Still the Keynote



March 17, 1952 • ELECTRICAL WORLD

FALCON DAM AND POWER PLANTS as visualized by the engineers. The Mexican plant is at the upper left of picture, the American at center right. The controlled spillway at the right has six 50 x 50-ft fixed wheel gates which can spill up to 456,000 sec ft in flood season

No Controversy Over Falcon Project

While storms rage over proposals to build power plants on St. Lawrence and Niagara Rivers, Mexico and United States are building two 31,500-kw stations on the Rio Grande

While a nationwide controversy ... in comparison with that of the ne... over construction of po... ern projects. ... vides for three international dams. These ar... by the two ge... ective ... ers for ... the ... he Fal...

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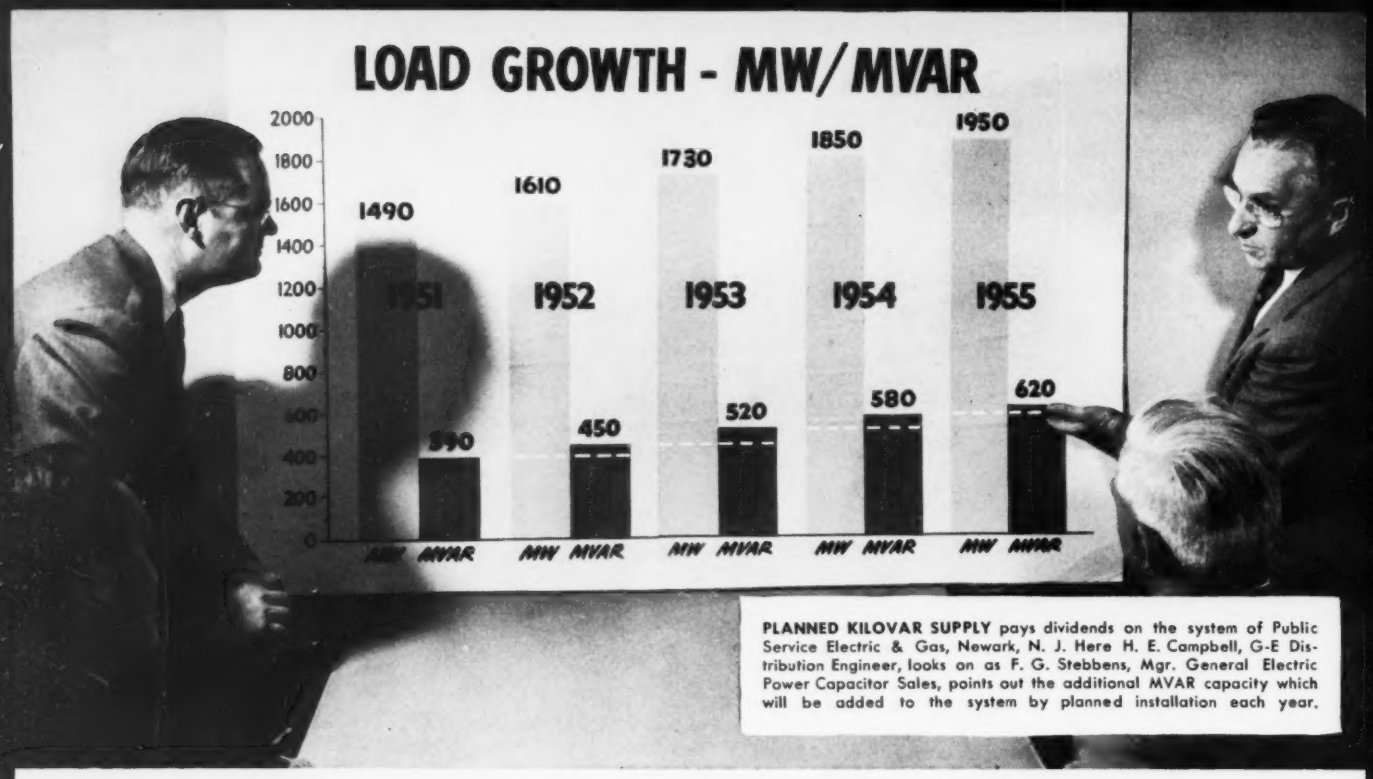


PLANNED KILOVAR SUPPLY pays dividends on the system of Public Service Electric & Gas, Newark, N. J. Here H. E. Campbell, G-E Distribution Engineer, looks on as F. G. Stebbens, Mgr. General Electric Power Capacitor Sales, points out the additional MVAR capacity which will be added to the system by planned installation each year.

Planned approach to capacitor buying achieves

GREATER UTILIZATION OF SYSTEM INVESTMENT

Confronted with a continued load growth problem, many forward looking electric utilities are now planning their kilovar capacity annually along with their kilowatt capacity. This procedure not only insures meeting peak kilovar loads but also makes provision for contingencies to insure satisfactory system voltage and best utilization of all parts of the transmission and distribution systems.

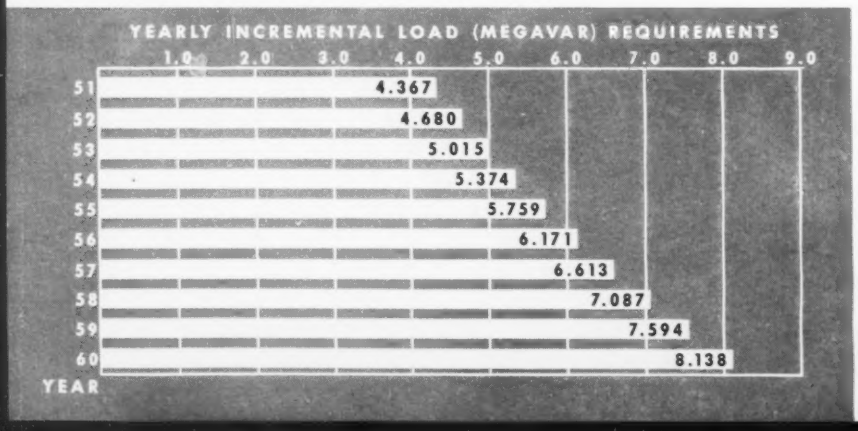
From the financial standpoint, this planned approach offers the opportunity for additional economies by permitting smaller year-by-year appropriations and, at the same time, insures adequate power factor to meet any condition that may reasonably be anticipated on a system.

It is significant that planning makes sound operating sense because the kvar of capacitors installed in the past 20 years has increased almost 25 times as much as the increase in peak kilowatt loads, and this trend is continuing. General Electric Co., Schenectady 5, New York. 301-246

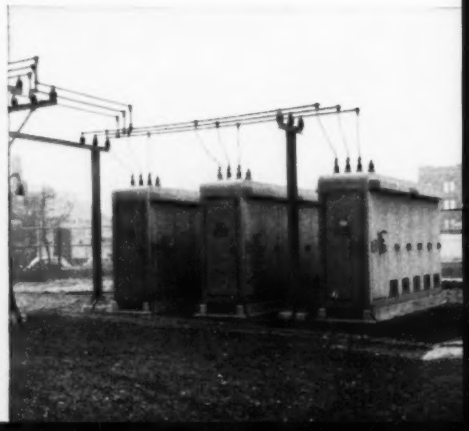
MORE POWER TO AMERICA

GENERAL ELECTRIC

TO MATCH THE NATION'S PEAK LOAD, expected to double in 10 years and to average 70% power factor, the utility industry will have to install increasing numbers of capacitors each year as shown by this graph. Figures shown are in thousands of megavars.



THIS TRIPLE BANK OF CAPACITORS was installed by Public Service of New Jersey as part of their capacitor budgeting program.



VOLUME 140, NO. 19

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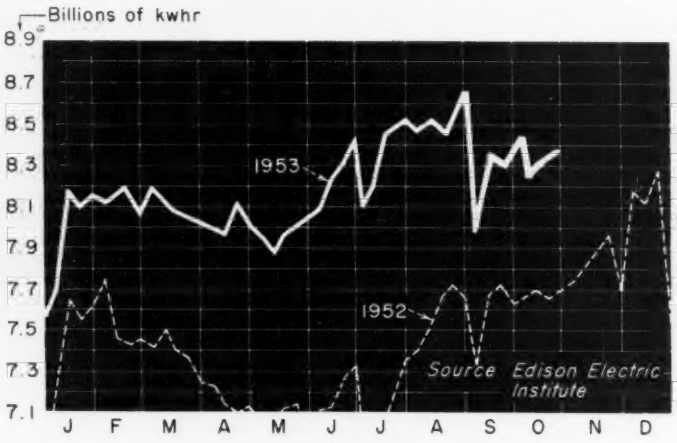
Electrical World



Output Week Ended Oct. 31—8,361,593,000 Kwhr

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Oct. 31	+7.9	+5.9	+3.5	+3.1	+5.9	+18.9	+3.8	+6.5	+22.9	+4.4
Oct. 24	+7.9	+6.1	+2.9	+2.5	+4.2	+17.8	+11.3	+6.8	+24.6	+4.0
Oct. 17	+7.6	+5.6	+3.0	+2.1	+3.6	+17.7	+9.0	+7.0	+23.2	+5.1

Electric Power Statistics

		Latest Month	Preceding Month	Year Ago
Peak Load (Million Kw)	July	76.6	76.0	67.2
Capacity (Million Kw)	Sept.	87.59	86.63	78.76
Production (Billion Kwhr)	Sept.	37.04	38.50	33.38
Hydro	Sept.	7.59	8.45	7.36
Fuel	Sept.	29.45	30.04	26.02
Fuel Consumption				
Coal (Million Tons)	Sept.	9.70	9.70	8.84
Oil (Million Barrels)	Sept.	6.16	6.55	6.05
Gas (Billion Cu Ft)	Sept.	105.30	112.88	96.38
Sales (Billion Kwhr)	Aug.	32.82	32.13	29.39
Residential	Aug.	8.48	8.47	7.53
Commercial	Aug.	5.98	5.81	5.46
Industrial	Aug.	15.83	15.50	14.10
Other	Aug.	2.52	2.35	2.30
Net Income Class A & B Companies ($ Million)	Aug.	77.43**	74.11	69.39
Estimated Dec. '53 Peak (Million Kw)	Aug.	86.2	86.2	88.4
Kwhr per Residential Customer (12 Month Average)	July	2,273	2,257	2,104
Revenue per Kwhr Residential Service (12 Month Average)	July	2.76¢	2.76¢	2.78¢
Canadian Production (Billion Kwhr)	Aug.	5.09	5.18	4.97

Business Statistics

FRB Industrial Production Index†††	Sept.	236*	238**	232
Gross National Product Annual Rate ($ Billion)	2ndQtr.	372.4	362.0	345.1
EW 5 Industry Production Index	Sept.	128.9	129.2	125.8
ENR Construction Cost Index††	Aug.	128.3	126.6	122.7
BLS Consumer's Price Index	Sept.	115.2	115.0	114.1
NEMA Insulation Materials Sales Index†	Aug.	153	150	128
NEMA Electric Appliance Sales Index†	Aug.	90	86	100
NEMA Household Refrig. Sales Index†	Aug.	63	87	75

* Preliminary ** Revised † 1947-49=100 †† 1949=100 ††† Unadjusted

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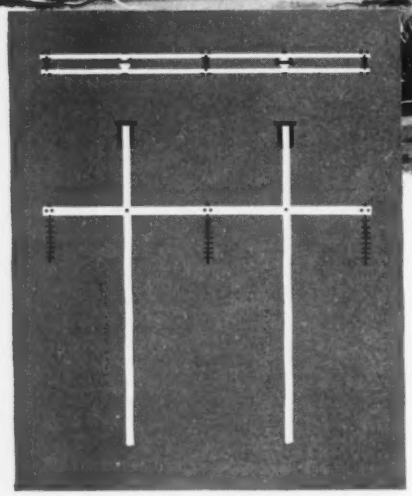

Type No. 700
Tangent Structure
for voltages 69 to 154 KV*

LIST OF MATERIAL

Quantity	Description
2	Crossarm
3	Steel spacer fitting w/mounting bolts
2	Stud bolt ⅞" w/2 washer nuts
4	MF locknut ⅞"
2	Static wire support
4	Machine bolt ⅝" w/locknut
2	Clevis
2	Suspension clamp for static wire
as req'd	Suspension insulator and fitting

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THE ELECTRICAL WEEK

The Issue's News Highlights—Private development of nuclear power gets strong support at conference on Atomic Energy in Industry.

Missouri cooperative seeks court action to force federal government to honor contract between co-op and SPA.

Business investment for new plant and equipment is expected to remain high in 1954. Utilities plan to invest just about as much next year as this year.

A basic atomic energy patent, that covering use of moderators such as graphite and beryllium to slow down neutrons, was released by Atomic Energy Commission for use by private industry on a royalty-free basis. AEC purchased the patent earlier this year for $300,000 from five Italian scientists who obtained it in 1940. The patent would be an important factor in nuclear power development should the Atomic Energy Act of 1946 be amended to let private industry get into the business.

Seattle City Light will study a site one mile from the Canadian Border on Pend Oreille River as a possible location for a hydroelectric plant. E. R. Hoffman, City Light superintendent, said he would apply shortly to FPC for a preliminary permit.

Kentucky Utilities is trying to take over power facilities of East Kentucky Rural Electric Cooperative Corp, the co-op's manager charged. KU had proposed, and the co-op rejected, a plan whereby the private company would operate 1,000 miles of the co-op's transmission lines on a lease agreement. The co-op threatened to stop purchase of power from KU and contract for its needs with Tennessee Valley Authority.

NLRB declined to enter dispute between Inter-County Rural Electric Cooperative, Danville, Ky., and IBEW, AFL. Union petitioned the labor board for a hearing when the co-op refused to recognize five foremen as its representatives. NLRB said it could lawfully assert jurisdiction, but refused on the basis of the intrastate character of the co-op's operations.

Washington State Public Service Commission refused to review its approval of merger of Puget Sound P&L with Washington Water Power. Rehearing had been asked by public power, grange and labor groups as preliminary to a court appeal.

Governors of Washington, Oregon, Idaho and Montana decided to invite public and private power interests to meeting in Seattle to plan a co-operative movement for development of Columbia River on a regional basis.

New York State Power Authority finally accepted the FPC license to develop St. Lawrence Power Project. Reason for delay: Time spent battling legal obstructions to the license after its acceptance would be lost from its 50-year term. Three suits still are pending, but the Authority wants to get on with its engineering planning—hence the acceptance.

Off the Washington Wire—Donald R. Richberg, one-time member of New Deal hierarchy who left the government to become staunch supporter of private enterprise, will be counsel of Hoover Commission's task force on water and power resources. Richberg, a Washington, D. C. attorney, has represented a number of gas utilities before FPC, SEC and the Supreme Court.

Office of Defense Mobilization is considering raising its 1952-1956 goal of 42-million kw. One immediate effect would be to reopen the door for further rapid tax amortization certificates to electric companies.

REA Administrator Ancher Nelsen asserted there has been "absolutely no change" in REA's long-standing policies concerning loans for generating and transmission facilities. About one-fifth of the money loaned by REA since Republicans took over has been for G&T purposes, he said.

Central Maine Power Co applied for a license for a 76,000-kw hydro plant on the Kennebec River.

Ohio PUC ordered postponement of an Ohio Edison hearing after Copperweld Steel Co asked time to study proposed $2 million-a-year rate hike. Hearing was set for Nov. 19. Attorneys for Copperweld claimed the increase, which would affect some 800 industrial customers, would "jeopardize the industrial life" of their region, and cost Copperweld about $236,000 a year.

Bluffton, Ohio, Board of Public Affairs recommended that power be purchased wholesale, with the village retaining control of its distribution system. Ohio Power Co had offered $466,500 for the system.

Kentucky PSC set Dec. 17 to resume hearings on Union Light, Heat & Power's application for a $531,000 a year electric rate hike.

Long Island Lighting stockholders subscribed for 668,166 common shares of 685,648 offered on a 1-for-7 basis at $16 a share. Balance of 17,482 shares taken by Blyth & Co group. Employees subscribed for 35,315 shares of 100,000 common shares at $16 a share.

Gatineau Power sold its 9,000-hp steam plant and substation at Dalhousie, N. B., to New Brunswick International Paper Co.

Congratulations—Newell A. Clark and John T. Costello were elected president and vice president, respectively, of Essex County Electric Co, Salem, Mass. Clark was also elected president of Suburban Electric Co, Malden, Mass. Oliver T. Pulsifer was named vice president of Suburban Electric. All the utilities are subsidiaries of New England Electric System.

Obituary—Howard W. Leitch, 78, retired vice president in charge of electrical operations for Consolidated Edison Co of New York, Inc, died Nov. 1 in New York.

(*Continued on page* 10)

Private Nuclear Power Development . . .

. . . is theme emphasized by majority of the speakers at annual conference on Atomic Energy in Industry held in New York

You could almost say that the second annual conference on Atomic Energy in Industry, held last week in New York, was a conference of men who favored private development of nuclear power and changes in the Atomic Energy Act to make this development possible.

There were notable exceptions, of course. A. O. "Jack" Knight, speaking for the CIO as president of Oil Workers International Union, said the union intended to press its case for tightening the act to provide for complete federal development of power reactors and distribution of the power they produce. Sir Christopher Hinton, in charge of the production side of atomic energy in Great Britain, though he made no direct comment on the American situation, said he believed the system of government development and operation of power reactors and distribution of their power was an efficient one for his country.

But by and large, most of the speakers supported private development down the line, even though they differed on how the act should be changed and exactly how the development should come about.

Promise of Action . . . Rep W Sterling Cole, (R., N. Y.), chief speaker at the dinner session, announced:

"It is my intention in January to introduce legislation—in cooperation with the (Atomic Energy) Commission and the Administration—to the end that private development of atomic power may go forward."

The chief problem of private development, he suggested, was bringing in the dollars of private enterprise at a time when large central power stations may not represent an attractive proposition to private investors. Certain specialized applications, he suggested, might provide the attraction necessary. These, he said, might include:

- Large atomic power plants to supply power to outlying Army and Air Bases, such as that at Thule, Greenland, where price of power from conventional plants is very high, primarily because of fuel transportation costs. There is no transport problem with nuclear fuels, and this would be a decided asset in event of war.
- Mobile or floating atomic power stations capable of supplying electricity to disaster-struck areas in peacetime and bombed-out ports and military beachheads in the event of war.
- Small, packaged power plants to power remote radar warning systems and interceptor bases.

For Cautious Approach . . . Although he agrees that in time changes in the act should be made to allow competitive enterprise to have a hand in nuclear power development, Rep Chet Holifield, a colleague of Cole on the Joint Committee, urged that Congress proceed with caution.

Holifield said the nation must be certain that national security will not be jeopardized before fissionable material is diverted to non-weapon use.

"The primary problem," he said, "is to meet our production needs for fissionable material—we can't divert it to use as a substitute for coal for use in the nation's power systems."

"Normal Rights, Normal Opportunity" . . . At the same panel session, Walker L. Cisler, president of Detroit Edison Co and the Atomic Industrial Forum, reiterated his long-time contention that American industry can best be relied on to speed the nation's progress toward practical use of the new power resource.

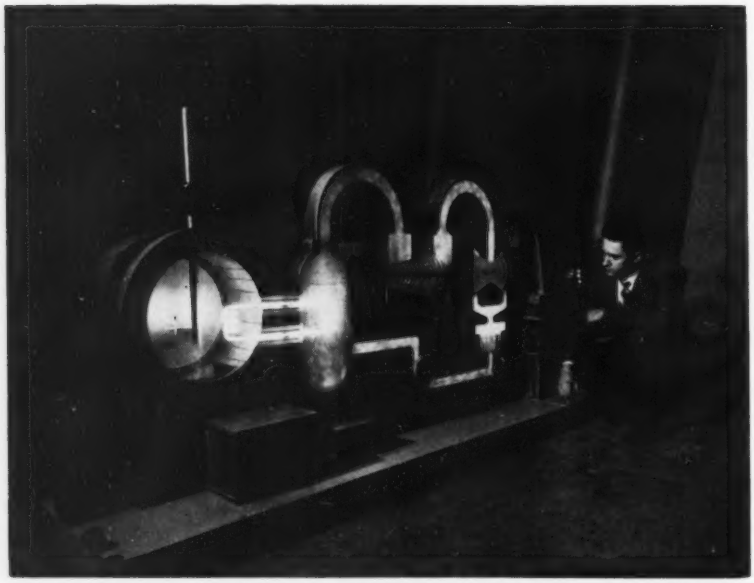
As between government and private development, he said, only the second "is within the framework of our traditional American economic system."

The Atomic Energy Act, he said, should be changed to give industry "normal rights of ownership and normal opportunity to recover investments and pay its investors a fair return."

Eugene M. Zuckert, an AEC member, leaned strongly toward Cisler's view.

Wants None of It . . . Knight, who said he voiced the opinion of the CIO, spoke out strongly against industry participation.

"If the federal government," he said, "could develop atomic energy for the



MODEL of electric generating plant, powered by atomic energy, was displayed by Westinghouse Electric Corp at conference on Atomic Energy in Industry held in New York Oct. 29-30

military, it can do the same job for the peaceful development of power."

He warned that changing the patent provisions of the act would permit atomic energy to develop into a private monopoly operated by the largest corporations to the detriment of the people.

Voice from Britain . . . Speaking at a luncheon session, Sir Christopher Hinton told his audience that Britain recently had started to construct a thermal reactor from which power would be produced in industrial quantities to be fed into British Electricity Authority's 132-kv grid system.

In a press conference before his talk, he said this reactor would be dual-purpose; a plutonium reactor in which power would be produced.

How Do You Begin? . . . Two panels of experts contributed opinions on (1) reactor design and (2) commercial power from reactors:

John R. Menke (Nuclear Development Associates): The U. S. atomic energy industry now knows how to build nuclear power plants but hardly anyone is convinced of the economic practicability, especially because market value of the fissionable by-products are not certain. Success of the breeder reactor hinges on this. Homogeneous reactors are low in neutron economy but surpass in costs of processing and in capital outlay. Fast reactors reflect good neutron economy and revenue but capital outlay is uncertain. Briefly, it is much too early to fix on any single type.

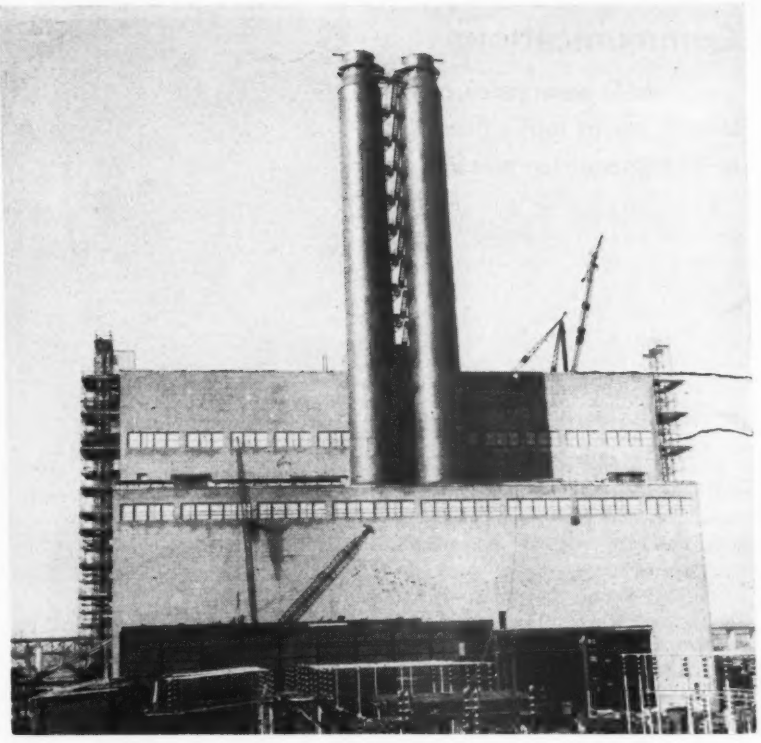
W. E. Kingston (Sylvania Electric Products, Inc): Getting the heat out of the nuclear mass has become one of the major problems and efficiency will depend on success in this technique. Also unreacted material must be capable of prompt and inexpensive recovery. Breeder reactors will become an important source of nuclear fuels. Low-cost methods for production and recovery are in sight.

D. R. Bower (Commonwealth Edison Co): Company is sure economic nuclear power would be achieved. Today's main obstacle to competitive status is lack of experience that can be gained only by building and operating reactor power plants of large size. Cost per kwhr would be 10 to 12 mills compared to 7 mills for modern steam plants using conventional fuel. A 2-mill credit could come from sale of recovered plutonium or refined fuel at $20 per gram. Bower would "be the last to advocate launching a nuclear power industry that required a government subsidy to perpetuate it," but at the present stage a "credit of only 1 to 3 mills per kwhr for national defense" would render reactor power competitive with current practice.

John J. Grebe (Dow Chemical Co): A thermal reactor of the Brookhaven type is not deemed favorable for industrial power development. The fast breeder is looked upon more favorably. Power plants never before have had a "double-boiler" with a temperature-limited source of heat along with a dense medium motive-fluid and the wide freedom of choices is currently confounding the engineers. The kind of enterprise freedom that results in sound progress is the kind that can stand on its own feet.

Philip N. Powers (Monsanto Chemical Co): The AEC reactor program announced by AEC Commissioner Murray would, it was feared, confuse the industrial efforts and be expensive above the level of attracting private capital into the field. Rather open the field to private industry for development and reject the disposition to "leave it all up to the government."

C. C. Whelchel (Pacific G&E-Bechtel team): It is not expected that nuclear power will supplant power generated by hydro and conventional steam stations. On the contrary it should fit into ever-growing integrated power systems without displacing generating facilities or preventing continued construction of hydro and conventional steam plants.



Con Edison Puts Astoria Plant in Service

Consolidated Edison Co of New York put the first 180,000-kw unit of its new plant in Astoria, Queens (above) in operation late last month. The giant unit went on the line Oct. 29 without any ceremony. Another turbogenerator of similar size is expected to be ready for service next spring. When complete, the Astoria plant will supply about half of the power needs of the borough of Queens.

Communications . . .

. . . under emergency conditions is one of topics discussed at PEA committee meeting

Re-examination of the allocation spectrum for civil and military services is more important than channel splitting as the solution to the overcrowded land mobile communication bands, said Frederick T. Budelman, Budelman Radio Corp, before the Oct. 30 meeting of the Pennsylvania Electric Association Communication Committee at Lancaster, Pa.

Budelman also noted the channels could be shared by a block assignment plan and urged a more intelligent study of present assignments.

Emergency Setup . . . H. R. Wilson, Philadelphia Electric Co, outlined his company's defense program. He pointed out that drills in which emergency conditions are simulated indicate that operation of the communications system becomes easier each time an exercise is held. Wilson, who is in charge of the defense program's communications section, said that available are: (1) leased wire facilities, (2) radio facilities for a communication center and 34 fixed stations employing mobile units, each operating on one frequency, (3) some 20 handy-talky radios distributed around the system, and (4) certain Signal Corps communication equipment. For use in an emergency another dispatcher's headquarters with telephone and radio service has been located remote from the city, he said, and the facilities are tested weekly.

Electronic Telephone . . . A. R. Royle, general manager, Gai-Tronics Corp, told of the development of an electronic telephone for use in high-noise level areas without the need for noise-proof booths. Transformer-connected to a conventional telephone circuit, the device needs a 105-125 v, 60-cycle source and consumes 12 watts. A transistor-battery operated unit is being developed, Royle declared.

A packaged conversion kit to change from 6 to 12-v operation on present Link mobile radio units will be available in a couple of weeks, reported S. Meyer, Link Radio Corp. This kit can be used also with the low-priced cars to have V-8 engines and 12-v electric systems, he said.

Electric Heating for Large Steel Billets

Low frequency (60 cycle) induction heating method for 13 x 13 x 32-in. steel billets was demonstrated by West Penn Power Co (in cooperation with Geco Inc, Cleveland, Ohio) at West Penn's substation, Uniontown, Pa., on Oct. 30. Picture shows 1,500-lb steel billet being removed from 300-kw experimental induction heating coil after being brought to uniform 2,200 F temperature in 57 minutes elapsed time. (This is one-tenth time normally required using conventional fuel-fired furnace.) Power was "on" for only 40 minutes, consuming 213 kwhr. Pictured at left is M. R. McConnell and, at right, C. H. Hartwig, both of West Penn.

West Penn is conducting an induction steel heating clinic and is making facilities available to area steel operators for their individual experiments (with samples of their own steel) for next few weeks.

POWER BRIEFS

● Federal Power Commission has issued a 50-year license to Pacific Gas & Electric Co for its proposed $40.5 million hydroelectric project on north fork of Feather River.

● Consumers Power Co plans to construct a 135,000-kw addition at its B. C. Cobb Plant at Muskegon, Mich. Cobb Plant now has capacity of 180,000 kw. New unit is scheduled for operation in 1956.

● Central Louisiana Electric Co formally dedicated its $3.6-million Teche Power Station late last month. Located on Highway 90, one mile east of Baldwin on the Charenton Canal, the station has a capacity of 20,000 kw.

● New York State Power Authority has moved its headquarters from Albany to Ithaca in an effort to coordinate activities on its project to join Canada in developing St. Lawrence River power.

● Last of six 60,000-kw generators at Dayton Power & Light Co's O. H. Hutchings Station went into operation last month.

Strobosopic Testing

In Electrical World's Nov. 2 report of the meeting of the Pennsylvania Electric Association's Meter Committee page 79, E. H. Tyson, Pennsylvania Power & Light Co and C. H. Cottle are misquoted as saying "Strobosopic testing is ***not*** sufficient for calibrating watthour meters". The statement should have read: "Strobosopic testing ***should be*** sufficient for factory calibration of watthour meters."

Co-op Seeks to Enforce Pact

Central Electric Power Cooperative in Missouri bringing suit to force government to honor contract made with SPA

A Missouri electric cooperative is seeking court action to force the federal government to live up to power contracts entered into by the former Democratic Administration.

Directly involved is a contract under which Southwestern Power Administration was to purchase power and lease transmission facilities from Central Electric Power Cooperative of Linn, Mo., but any court action taken is bound to have a bearing on four similar contracts which SPA entered with other Missouri and Oklahoma power co-ops.

Out on a Limb . . . Central Electric and the other co-ops found themselves out on a limb in late July. All had built or were building generating and transmission facilities for use by SPA under contracts negotiated back in 1950. In late July Congress adopted an Appropriations Committee conference report prohibiting SPA from spending any money to carry out its bargain with the co-ops.

The suit being brought in a federal district court in Washington seeks to test:

- The indirect method which Congress used to cut off money for carrying out the contracts.
- The action of Interior Secretary Douglas McKay in directing SPA to withdraw from the contracts.

Dramatic Example . . . Central Electric likely was chosen to bring the suit because it presented a more dramatic example of the effects of the Congressional action.

The co-op, made up of five distribution co-ops, had built 520 miles of 69-kv transmission line and a 15,000-kw generating plant with funds borrowed from the federal government. This was built after the co-op had negotiated a contract with SPA to lease the lines for about $598,500 a year and to purchase the output of the steam plant for approximately $1 million a year.

Legality of both the REA loan contract and the SPA lease-purchase contract was attacked by electric companies in the area, but a district court upheld the contracts (EW, June 29, p 66).

Co-op's Argument . . . In bringing suit to force SPA and Interior to live up to the contract, Central Electric contends that the language used in the conference report is not a part of the law and does not restrict the law. It argues that the law providing for the continuing fund is "clear, unambiguous, concise and unequivocal in meaning . . ." The report would have standing in court, Central contends, only if it might clear up ambiguous language in the statute.

A second contention is that Secretary McKay, in ordering SPA to suspend the contract, was not acting in conformity with the law but with the conference report.

Even if it should win the case, it is difficult to see how Central Electric could gain more than temporary relief from its present situation. The Appropriations Act clearly states that the funds are not to be available after next Feb. 28, and Central does not take issue with the language of the act.

Harmony Keynotes Farm Conference

Research that will help make the farmer more prosperous and electrical suppliers and manufacturers equally so was the focal point of the seventh National Farm Electrification Conference held in Washington, Oct. 27-28. Among speakers pledging their cooperation in furthering the aims of research were Walter H. Sammis, left, above, president of the Edison Electric Institute, Clyde T. Ellis, right, above, executive manager of the National Rural Electric Cooperative Association, and Ancher Nelsen, administrator of the Rural Electrification Administration.

"With such a large segment of the population engaged in farming, the electric utility companies deem it a challenge to continue their best efforts to make electricity do more and earn more for the farmer and his family," Sammis said.

Ellis emphasized that "if we do not let ourselves become excited and find that we are tied up in knots of rivalries unrelated to our main tasks, we will build a better farm market and serve the interests of those in that market—the farmer—better each year."

Speaking for the government, Nelsen said that "working together, we can help the farmer and provide a market for electrical products, increase sales of electric energy by all suppliers, and assure that REA loan repayment schedules continue to be met."

THE ELECTRICAL WEEK
CONTINUED

An order issued by Georgia PSC raised the question: Can a state commission compel a power company to buy power from the cheapest source available? The issue was raised when, in granting a $128,000 rate increase to Georgia P&L, the commission ordered the company to show cause why it should not purchase its power from Georgia Power Co at a lower rate than it now purchases power from its parent corporation, Florida Power Corp.

Two 17,000-kw units went on the line at the federally built Tennkiller Ferry Dam in Oklahoma. Power will be distributed by Southwestern Power Administration, some of it going to private companies in the area.

State of Washington became an intervenor in the FPC hearing on development of Hells Canyon on the Snake River between Idaho and Washington. The state, through Gov Arthur B. Langlie, wants to put evidence in the record favoring the three-dam plan of Idaho Power Co as against the high-dam plan of the federal government.

Nearly 100 power co-op representatives in 10 Missouri Basin states voted to ask Administration to delay for one year its proposed new power marketing policies.

IN THE INDUSTRY

Nuclear energy presents the electric utility industry with a chance to play a role it has never played before. Utilities did a superlative job in the two World Wars in supplying for preparedness the industrial power that was never too little nor too late. Now the pendulum has started to swing away from stock-piling of arms and munitions to a new national objective of global preparedness. Maybe we are well enough off to cease worrying about the weapons build-up but not well enough established among our free-world allies to be content with industrial productive capability in the nations ringing the Iron Curtain on the outside.

Nuclear Fuels Have Great Potentialities . . . Some of these nations are primed for industrial activation. But some are fatally short of power sources from both fossil fuel and hydro. That is exactly where nuclear fuels have their greatest economic potentialities. Lightweight, highly concentrated fuels like uranium and plutonium would be a godsend to them. It would spark their latent desire to equal the industrial competency of the U. S. It would relieve unemployment and the excuses for communistic leanings in those retarded areas. It should make friends of all of them.

At that point the American electric utilities enter the picture. If they were permitted and authorized to build duel purpose fuel-breeding reactor plants they would serve the international cause in two ways. One would be to accelerate the know-how process in operating nuclear power plants. The other would be to make available the by-product plutonium to be the foundation for economically justifiable generation in fuel-short areas around the world.

The government would thus make it available as a modern 1953-54 alternative to the outlived Marshall plan.

A fair price for plutonium would contribute to making the nuclear generation economically feasible at home. That's why the government should offer a firm bid price for plutonium produced by utility nuclear plants.

Costs of Single-purpose Reactor Plants Should be Disclosed . . . These ideas were, in fact, carried a step further at a session on developing commercial atomic power at the conference on atomic energy held recently in New York by National Industrial Conference Board. In summing up, Walter Zinn, director of Argonne National Laboratory, said the consensus was that AEC should disclose the actual cost of all components incorporated in the single-purpose reactor plant which Westinghouse Electric Corp has contracted to build. Such information, he said, would firm up information on which utility-industry teams have based their estimates of cost of nuclear plants and nuclear power.

But, in the event this is done, would the utility industry be ready to step in and develop dual-purpose plants that could help implement a nuclear Marshall Plan?

This is what Edgar H. Dixon, president of Middle South Utilities and chairman of Edison Electric Institute's atomic energy committee, had to say at the NICB conference:

"There is every indication that the work of the Atomic Energy Commission, the several study teams and others sooner or later will bring us to a position from which the prospect will open up for full-scale private development of commercial nuclear power. With this goal in mind, the electric utility industry should be willing to spend its own money in harnessing this new energy source on a commercial basis.

"I have great faith that the United States **will** win the atomic power race and complete confidence that the electric power industry will make an important contribution toward this victory."

TECHNICAL NOTES
ARCHER E. KNOWLTON

Repeated a.c. testing produces cumulative damage with consequent reduction in dielectric strength even at voltages far below the short-time breakdown strength of mica insulation.

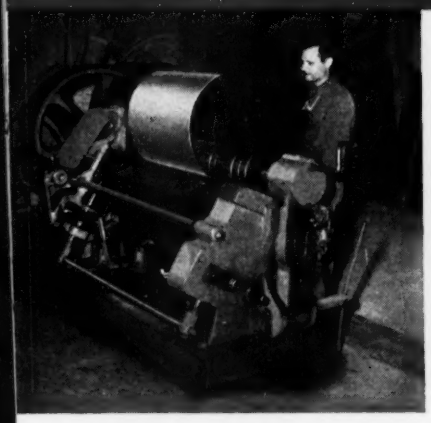
Storage battery separators contribute negligibly to the internal resistance of the cell; except at high discharge rates omission of the separators would contribute little to performance.

Sufficient bandwidth in tuning and by-passing equipment is relatively difficult to achieve in carrier below 50 kc and speech runs the risk of distortion.

High fuel cost is not necessarily the prime reason for the popularity of reheat. Dominance of the unit plant design and the gain in thermal efficiency deserve part of the credit and so does progress in boiler designs and steam temperature controls.

Opportunity for transfer to a new power plant was sought by more than 1 in 4 of the operators in a company's older plants.

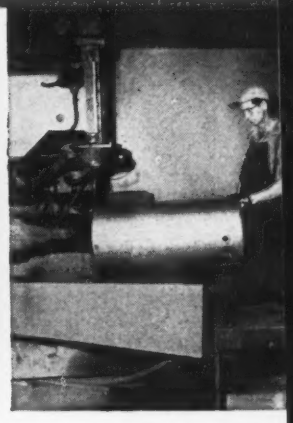
This is how *Kuhlman* makes distribution transformer tanks



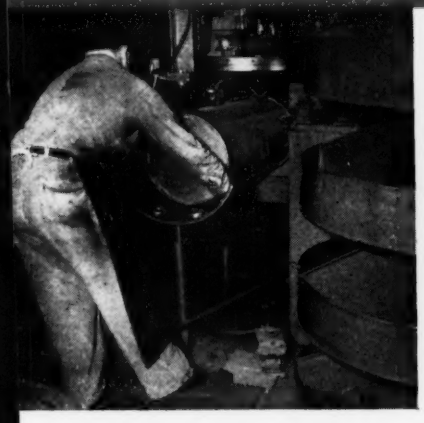
1. All Kuhlman transformer tanks are made of heavy gauge copper bearing steel. Here a tank begins to take shape. The steel has been measured and cut and the necessary openings made. It is now being rolled into the shape of a cylinder.

2. After the metal has been shaped, the edges are brought together and electrically welded to form an oil tight seam.

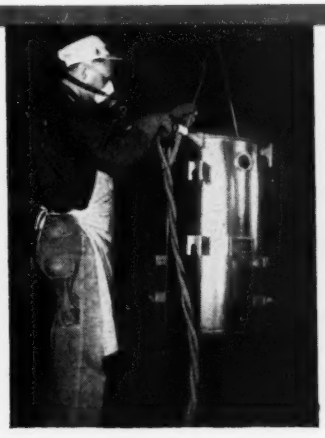
3. Next, the top end is "rolled down" to a smooth lip to form a suitable gasket seat.



4. The next step is to attach the bottom. This is first "spotted" and then electrically welded all the way around to form an oil tight seal.

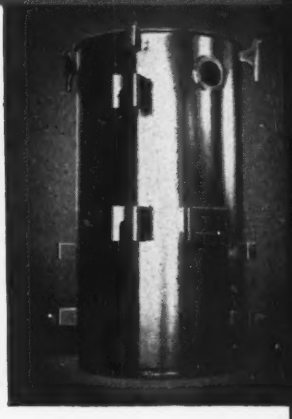


5. After the bottom end has been "rolled down" to form a smooth lip, the necessary accessories such as lifting ears, nameplate bracket, and mounting brackets are spot welded onto the tank as shown above.



6. Before they are painted the tanks are chemically cleaned and then shot blasted to assure a clean painting surface. Each tank receives a coat of rust inhibiting primer and two coats of corrosion resistant paint.

7. After each coat of paint the tanks are "baked" with infrared lights to insure a more durable finish.



8. And here is a completed tank, ready to receive its core and coil assembly and all necessary connections. Surfaces of Kuhlman tanks have successfully withstood 500 hours of salt spray and weatherometer tests.

Kuhlman transformers have been "on the line" for over half a century. Many of the earliest Kuhlman transformers are still in service—proof that Kuhlman builds rugged, highly efficient transformers. Specify Kuhlman. For more details about distribution transformers, ask for Bulletins CS-201 and CS-202.

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"They've always got lights down the road..."

"That's right, and 'CSP®' Transformers are the answer," reports an official of a western utility.

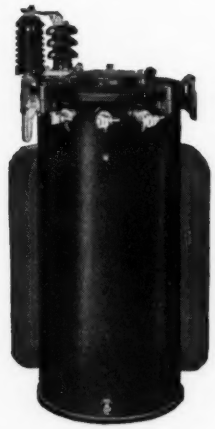
"But farms like this one, just a short distance up the road, are served by an outfit that has not yet taken advantage of 'CSP' Transformers. Gives you a good chance to compare.

"Sometimes a lightning storm—and we get plenty of 'em—means no power up there for as long as 48 hours. On our lines, outages are almost a memory. Even in the rare case when an extreme overload trips a breaker, we can restore service with the 'Emergency Control' in a matter of minutes.

"Another thing. Our rural customers usually report the red warning light on 'CSP' Transformers. That cuts down load checks—and outages."

Installation and maintenance costs for Westinghouse "CSP" (Completely Self-Protecting) Transformers are always lower, because complete lightning and thermal protection is built in, not separately mounted.

Ask your Westinghouse representative for Booklet B-5617A, "Haul 'Em Out—Hang 'Em Up—Forget 'Em"! Or write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70663



"CSP" devices . . . originated and patented by Westinghouse

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Sangamo . . . Good Meters Since 1899

Sangamo Type J . . . Performance-proved by thirteen years of service

For thirteen years J Meters have met and exceeded every requirement of performance for the Utility Industry that has been imposed by continuously growing loads.

These thirteen years of satisfactory service are a measure of proof of the electrical and mechanical stability of the J Meter—the design that mounts the moving element, damping magnets, register, and the electro-magnetic system on a single rigid frame.

These thirteen years have also proven the ability of the J Meter to sustain accuracy, reduce operating costs, save maintenance expense, and provide ample capacity for the load growth of this period.

Thus, by every measure of value it's good business to buy Sangamo Type J Meters.

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Only Measured Facts are Known Facts

JM53-6

Good Neighbors Dedicate a Dam

A dam astride the Rio Grande provided a meeting place Oct. 19 for the Presidents of the two North American republics and a symbol on which they could reaffirm the continued friendship and cooperation of the peoples they represent.

The dam was Falcon, built by International Boundary and Water Commission to provide irrigation water and power for the people of the United States and Mexico. The occasion was its dedication.

Presidents Eisenhower of the U. S. and Ruiz Cortines of Mexico made the dedication addresses and seemed to enjoy the festivities that went along with it immensely. The structure they saw is the lowermost of three to be built by IBWC on the unpredictable river, to save the area's residents from the uncertainties of alternating flood and drought. The five-mile dam has separate power plants on either side of the international boundary, each of which will produce 31,500 kw. Cost of $47 million will be borne by the two countries in proportion to the water

Two Presidents met for the first time . . .

. . . at Falcon Dam, which their peoples own

1 IKE ARRIVES FOR FALCON DEDICATION at Air Force base at Harlingen, Tex., where he is welcomed before driving to . . .

2 . . . Mission, Tex. Here he is the guest of Gov Allan Shivers, Democrat who supported him last year, and his family

4 At Nuevo Guerrero, town created to house people dam displaced, Ike meets Mexican President amidst press of photographers

5 In 90-degree heat that seemed to faze neither, the two chiefs of state watch a fiesta. Here, troupe dances a gay Huapango

they take—58.6% for the U. S., 41.4% for Mexico.

Under the Water Treaty of 1944, the lower dam was to be built first, to capture millions of acre-feet of water wasted annually into the Gulf of Mexico.

Although no private power-public power issue has been raised at Falcon Dam, the people who should know have sort of an embarrassed look when you ask them what is going to be done with the power generated on the U. S. side. Congress must designate the marketing agency and that it has not done. A proposal has been put forward that U. S. Bureau of Reclamation handle sale of power. But Harvey McPhail, acting Reclamation Commissioner, shrugged when asked if he thought this might go through. How this would fit into the Administration's power policy is not clear.

In El Paso, Commissioner Lawrence Lawson of IBWC said he did not expect generation until late spring. What, he was asked, will happen if the generators begin to turn before Congress acts?

"I think Congress will act," he said.

The treaty provides that if either country is not able to use the power allocated to it, the other may buy it.

7 At luncheon and dedication ceremony which followed, U. S. President urged that good neighbor relationship continue

3 President's party motored to Falcon Dam. Crossing dam into Mexico, Ike returns salute from the international guard of honor

6 Presidents Ruiz Cortines and Dwight Eisenhower touch glasses in toast at a luncheon at administration building on the U. S. side

8 Dedication itself, atop dam, had serious air as two Presidents pledged their nations would stand together against totalitarianism

The day had some unhappy sidelights

● Don Guadalupe Ramirez, 77, was forced to abandon land near Zapata, Tex., which his family had farmed for 200 years. He and his neighbors feel they have not been paid enough for property inundated by the Falcon Dam project.

● News that a plane carrying Mexican newspaper men and dancers to the fiesta had crashed soon after taking off from Monterrey, killing all 14 aboard, lent sad note to celebration's gayety.

South Korea Power Expansion

Program will be undertaken for rehabilitation of war-damaged facilities and construction of new stations

SEOUL, Korea (McGraw-Hill World News)—Reconstruction of South Korea will include a foreign exchange expenditure of close to $30 million for rehabilitation and expansion of electric power generating capacity. The first stage of the program will get under way shortly with repair of 17 power stations at an estimated cost of $3.6 million for foreign engineering and equipment.

Restoration of Plants, Lines . . . Included in the project are repairs to the main thermal power plant at Yongwol which sustained extensive damage during the war, to other smaller generating plants, to substations and transformer stations, and to transmission lines. Not included are repairs to the dam and power plant at the Hwachon Reservoir, which is just above the 38th Parallel.

Repairs will boost South Korean generating capacity to approximately 100,000 kw. Present generating capacity is 53,000 kw, which is supplemented by 30,000 kw from electric barges supplied by the United States.

Power requirements, as estimated by the Prime Minister's Office of Planning are 130,000 kw in 1954, 175,000 in 1955, 220,000 in 1956, and 255,000 in 1957. To fill these rising demands, the Planning Office has asked that a three-year program be undertaken to cover repairs to Hwachon and construction of six new plants.

Estimated costs of rebuilding Hwachon are more than $3 million. Included are costs of repairing the dam structure, penstock, water canal, turbines, generators, switchgear, and transformers. When completed, the plant would have three 27,000 kw generators in operation.

New Construction . . . New construction would include two plants at Chyungju and Yoju each with a maximum capacity of 48,000 kw and costing $5.5 million and Hwan 4.8 billion each (Hwan 180 equals $1). The Chyungju plant would be a hydro installation with a gravity dam 62 meters high and 408 meters long.

A smaller, but more expensive hydro plant is proposed for Sumjimgang. Its capacity is scheduled for 27,700 kw. It would cost $8,650,000 in foreign materials and equipment, plus Hwan 4 billion.

Other smaller plants also are planned. One for Cheju Island is scheduled to be a 4-unit, 700-kw diesel installation. Many small industrial plants moved there from the mainland during the Communist invasion and are now idle for lack of power.

The current reconstruction program is being drawn up to American specifications and standards, although originally almost all the equipment in Korea was of Japanese manufacture. So it is considered likely that only part of the equipment will be purchased in Japan. New construction will be contracted for on bidding open to all nations, probably through United Nations Korean Reconstruction Agency.

HOME WIRING campaign plans are discussed by Cincinnati electrical men. Seated (l to r) are William Misrach, Richards Electric Supply; E. J. McGinnis, Cincinnati Electrical Association; C. W. Johnson, Johnson Electric; Jack Bogdon, B & B Electric; F. D. Brown, Westinghouse Electric Supply. Standing are F. E. Wiatt, E. W. Hodgetts, E. R. Keller, Cincinnati G&E

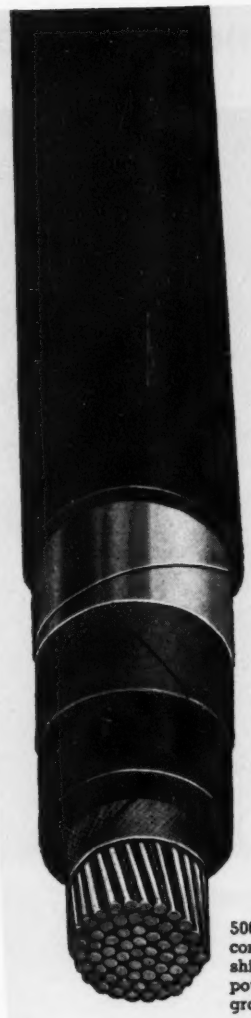
In Cincinnati the Target Is HW

A plan to boost adequate wiring in the homes of customers of Cincinnati Gas & Electric Co and Union Light Heat & Power Co now is under way. The wiring campaign, known as "Target HW," features a payment plan whereby cost of rewiring appears in monthly installments on the customer's electric bill.

The pay-as-you-go wiring plan was favorably received at a mass meeting of contractors, appliance dealers, and distributors held last month. The meeting, sponsored by Cincinnati G&E, was planned by representatives of the utility and distributors.

Here's how the plan works: The customer gives the contractor a promissory note for the amount of the rewiring cost. He also enters into an agreement by which the note is assigned to the utility by the contractor. The note is paid in monthly installments chosen by the customer, but in no case run more than three years nor amount to less than $2 a month.

The plan is available to any residential or farm customer served by the two utilities. The work covered by the plan may consist of any or all wiring changes and additions including lighting fixtures. In the case of rental property the agreement must be made with the owner.



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Q: WHAT IS ROZONE?

A: A PREMIUM quality, ozone-resistant, oil-base type insulation developed by Rome Cable research, exceeding *all* requirements of ASTM specification D-574. RoZone is exceptionally resistant to corona action and aging. It shows high electrical stability in water and possesses excellent electrical characteristics. While the preferred outer covering is a RoPrene (Neoprene) sheath, RoZone insulation can be supplied with either braided or lead sheath coverings. In addition, on shielded types of cable, a special thermoplastic sheath is available.

Q: WHERE IS ROZONE USED?

A: Rozone is recommended for all specialized or general purpose wiring where long-time dependability is paramount. It is particularly suitable for higher voltages up to 15 KV. With proper sheath protection, RoZone is widely used for high voltage underground and aerial power distribution, street lighting circuits, signal and control cables, as well as for low-voltage power requirements where conditions of moisture or heat are present.

Q: WHAT DO ROZONE TESTS SHOW?

A:
1. High resistance to aging. Longevity of original characteristics.
2. On the basis of long-time test, dielectric strength exceeding 400 volts per mil, for 5,000 volt services. Surge or impulse strength proportionately high.
3. Utmost resistance to corona and ozone cutting.
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In her boiler rooms, too, the Mitscher is outstanding. For she is the first U.S. ship "of the line" to use boilers of the controlled circulation type. The second is her sister ship, the recently commissioned U.S.S. John S. McKain.

In this recognition of the advantages of controlled circulation, the Navy parallels the course of the Utility Industry which since mid-1950 has ordered C-E Controlled Circulation Boilers to serve more than 6,000,000 kw of turbine capacity.

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C-E

ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT

Reclamation to Decentralize

Office operations of the bureau to be centered nearer Interior Department activities in western states

Reorganization of Bureau of Reclamation is under way, designed to shift more responsibility to field levels.

Immediate goal is to center the bureau's top-level technical work in Denver where the major engineering functions already are located. This calls for a de-emphasis of the Washington office, which is hundreds of miles from the nearest bureau project. The federal agency operates mainly in the 17 western states.

Main points of the reorganization plan:

- Promotion of Chief Engineer L. N. McClellan to an Assistant Commissioner of Reclamation in charge of the Denver office. Transfer to Denver of the project planning, operation and maintenance, and power utilization functions now performed in Washington.
- Reduction of the Washington office to staff and liaison functions essential to the office of the commissioner. Two assistant commissioners, one in charge of administration and the other in charge of operations, will remain in the Washington office.
- Retention of the regional office setup, but abolition of district offices in favor of project or consolidated project offices.

L. N. McCLELLAN

Based on Report . . . This plan of reorganization is based almost entirely on the report submitted late last month by a five-man survey team set up in August to study organization and functions of the bureau. Headed by E. A. Moritz, a former bureau regional director at Boulder City, Colo., the team turned in a critical appraisal of both organization and operations.

It concluded the bureau organization has been geared to a construction program considerably larger than it has ever undertaken, and recommended a re-orientation to conform with actual work load.

The report hit hard at the reviews, audits, and inspections imposed by the Washington office, and said many of these were repetitions and unnecessary indicating a lack of faith in bureau personnel.

Boundaries to Remain . . . Although the team recommended some reshuffling of regional office boundaries, Interior decided that boundaries are to remain as they now are. It was also decided that the California office at Sacramento is to be reinstated as a regional office. Earlier this year the Sacramento operation had been reduced to a project office.

It was generally assumed that the demotion of the California office was designed to permit replacement of director Richard Boke, whose missionary ventures on behalf of the bureau had drawn widespread criticism. Assistant Interior Secretary Fred G. Aandahl conceded last week that the rapidly changing status of the office was due to "philosophical" differences.

Hardest hit by the report was the Bureau of Reclamation manual, a work now numbering several volumes setting forth operating procedures, engineering criteria, and the like. The survey team was unanimous in recommending that all additions to the manual be suspended and that it be drastically cut to usable size.

Three-Phase Program . . . Reorganization is to be carried out in three phases spaced over a three-month period. During the first month, the main changes in the Washington office and transfers to Denver would be effected. Additions to the manual would be stopped.

Second phase involves reorganization at regional level, abolition of the district offices, and shift of functions needed to accomplish the reorganization.

Third phase would be a restudy of the work loads of the central, regional, and project offices with a view to actual personnel needs.

Controversial Section . . . A sizable section of the Moritz report dealt with "external factors influencing the Bureau of Reclamation mission." The Interior Department, in announcing the reorganization plan, said it had no comment on this portion of the report which dealt at some length with touchy issues.

Among other things, the survey team recommended that all requests of Congressmen, local interests, and interested persons be funneled through the office of the commissioner. It indicated that use of "pressure" from outside sources had forced out unjustified project planning reports.

N.Y. Niagara Plan Cited as 'Creeping Socialism'

New York State's efforts to gain the right to generate electric power at Niagara Falls is a distinct step in creeping socialism. This statement was made by Charles R. Sligh, Jr, president of National Association of Manufacturers, recently at Niagara Falls.

"If New York State can socialize a basic industry such as the manufacture of electric power on the premise that the state's natural resources belong to the people, what then is to prevent the State of Pennsylvania from similarly reasoning its natural resource of great coal fields also belong to the people?" he asked.

Sligh pointed out that power is the only thing involved in the controversy.

"This field has never been invaded by government before without the excuse of providing some additional public service not suitable for development by private enterprise. When an organ of government thus seeks to enter into the business of manufacturing electric power, pure and simple, then we must classify that venture as the socializing of a basic industry."

Safeguard Human Relations . . .

. . . from organized groups to prevent injury to our national well-being, Zellerbach warns National Manpower Council

"The determination of policies respecting the development and utilization of our human resources must not become the private preserve of organized groups which are primarily and understandably concerned with protecting and advancing the interests of their members."

This was the position taken by James D. Zellerbach, chairman of the National Manpower Council, in opening a recent five-day conference at Columbia University's Harriman (N. Y.) campus, on how to improve utilization of the country's scientific and professional manpower.

He said that an understandable failure to grasp the interrelatedness of policies for scientific and professional manpower and a public indifference to the significance of these policies "could combine to cause serious injury to our national well-being and strength."

Engineering Group . . . The findings of the engineering group, reported to the conference, noted that improved utilization can be defined as any step which increases the quantity or quality of goods and services produced with given amounts of capital, using the same number of technological personnel, or, alternatively, as any step which maintains a given level of output in terms of quantity and quality, with a smaller number of such personnel. The engineering group is under the chairmanship of Frank W. Pierce, a director of the Standard Oil Co of New Jersey and a member of the National Manpower Council.

This group agreed on the following points in connection with securing improved utilization:

1. The first step must be to make more effective utilization the focus of genuine and continuing attention at all levels of an enterprise.

2. If improved utilization begins at any one point, that point is improved training not only in the colleges and on the job but also in the elementary and secondary schools.

3. Much more has to be learned about the jobs which engineers and related supporting personnel are doing in order to reassign duties among different kinds of technical personnel.

4. Engineers must have the best tools and instruments as well as good supporting personnel if they are to make efficient use of their training and talents.

5. Improved utilization requires effective communication from management to engineering and related personnel about the objectives of their work. Moreover, as the actual changes in utilization take place well below the level of top management, effective communication upward is also essential.

6. Changes in the organization of enterprises can open up new possibilities for the better utilization of personnel. Too much organization may prevent necessary freedom in the allocation of effort while too little may result in duplication, lack of proper priority, and unwise allocation of personnel to projects.

7. Improved utilization can also be achieved by keeping technologically trained people at the technological jobs for which they are best fitted through incentives in the form of status, recognition, and money rewards which are generally associated with jobs in management and sales.

8. Utilization can be improved through recognition of the fact that an individual's effectiveness and interest on the job is affected by many things outside of his work.

9. Attempts to improve utilization must always take into account normal human resistance to changes in the setup which people know.

10. Utilization can be improved by management not only by calling upon the manifest capacities of engineering personnel but also by making an effort to develop their potential capacities through imaginative assignment and training.

11. Efforts to improve utilization must distinguish among what can be accomplished to secure immediate gains, what may yield results only after some investment of time and money, and what changes are fundamental and long range in character.

12. Improved utilization is achieved not through any single device but by the use of many related measures.

LABOR BRIEFS

"Those responsible for the nation's industrial training program must gear apprentice training and other skill improvement programs to the changing times," W. F. Patterson, director of the U. S. Department of Labor's Bureau of Apprenticeship, declared. In so doing, he said, "It will be necessary to discard many of our traditional views and take an entirely new look at our industrial training system."

A total of 5,129 students registered for the opening of the current academic year at the Massachusetts Institute of Technology, according to figures just released by Joseph C. MacKinnon, MIT registrar. This total, he said, represents an increase of 55 students over last year's registration.

Utility members of Local 77 of International Brotherhood of Electrical Workers, AFL, in the Pacific Northwest have voted down a referendum measure calling for merger of the Puget Sound Power & Light Co with the Washington Water Power Co. Many voiced the opinion that Puget "is perfectly capable of staying in business, and it is to the benefit of electricity users and labor alike that the company does stay in business."

A new education assistance program has been adopted by the Appalachian Electric Power Co to encourage and assist its employees in furthering their education as an aid to them in their work.

Employees of the British Columbia Electric Co who are members of the International Brotherhood of Electrical Workers, AFL, have voted to go on strike to back 10% wage hike.

1. Variac to control output voltage.
2. Range Switch transfers microammeter from 50 to 1000 microamperes range.
3. Guard Switch for by-passing stray currents to ground.
4. Neon Bulb protects against continuous overload.
5. Dual Range Microammeter measures leakage current.
6. Kilovoltmeter measures output voltage.
7. Calibration Curves translate microamperes into ohms resistance.
8. Power Switch (on-off control).
9. Grounding Post insures protection to operator.
10. Indicator Light (power on or off).
10
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L-M DC Insulation Tester, being used to check insulation on a Kyle Type H Recloser.

L-M's New DC Insulation Tester Assures More Positive Maintenance For Reclosers

New portable unit operates on 120 volts, 60 cycles; requires low input power; is easily handled by one man. Use of DC gives high degree of accuracy, tells relative strength of insulation, and avoids useless replacement of good insulation. Completely protected so the device cannot be damaged by a short circuit; can measure any part of a number of insulation paths, one stringer or an entire recloser. Costs only $375.

L-M's new DC Insulation Tester is a highly efficient, low-priced portable unit that provides accurate determination of the condition of insulation in reclosers or other apparatus.

With this tester you can greatly improve recloser maintenance. It avoids replacement of insulation that is still in good condition; and it indicates when insulation should be replaced so that a recloser with faulty insulation is not put back on the line.

It may be hooked up to test the complete apparatus, or just one stringer in the unit.

It measures the DC insulation resistance of the entire apparatus or any part, at test voltages from 1 KV to 15 KV DC. It operates instantly, there being no vacuum tubes requiring a warm-up period.

Leakage current is measured by a dual range microammeter with a 50 microampere and a 1000 microampere range.

One man can operate the unit. It weighs only 50 pounds, so that it is easily transported. Input power is low. The tester may be supplied from any 120-volt 60-cycle source.

Fully Protected

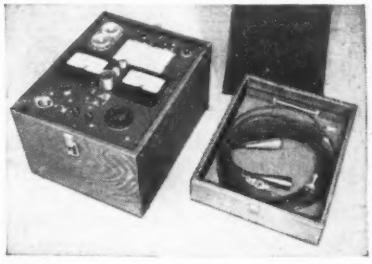
The microammeter is protected against sudden surges by an electrolytic capacitor across its terminals. It is protected against continuous overloads by a neon bulb that fires and by-passes the measuring circuit when an overcurrent occurs. Output current is limited in case of insulation failure by series resistors. The circuit high voltage components are protected against accidental over-voltages by an adjustable gap which discharges the output capacitor through a resistor.

Economical

The L-M DC Insulation Tester costs only $375.00. It takes out the guesswork and assures more positive recloser maintenance. A few moments' time can prevent hours of additional apparatus replacement, and the timely replacement of a faulty piece of insulation may prevent serious damage or complete destruction of valuable apparatus.

Get Complete Information

Ask the L-M Field Engineer for the new bulletin on the L-M Insulation Tester—or get a demonstration. Or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).



The L-M Insulation Tester is completely self-contained. Cover holds all leads, power cord, and instruction book. The whole unit weighs only 50 pounds.

LINE MATERIAL

Kyle® Reclosers

Table I—Reactor Designs Studied by Industrial Participation Contractors for Regenerative Dual-Purpose Reactors

Group	Reactor Designation	Neutron Energy	Fuel	Moderator	Coolant	Temperature In °F.	Temperature Out °F.	Power Gross Heat Mw	Power Net Elect. Mw	Cyl. Core Diam. Ft.	Cyl. Core Hgt. Ft.	Pressure Vessel	Est. Cost of Plant Total Millions	Est. Cost of Plant Per Kw	Remarks
Commonwealth Edison and Public Service of Northern Illinois	HGR — Helium-Graphite Reactor	Thermal	Natural Uranium	Graphite	Helium	384	650	350	47	35	20	Sphere 44 ft Diam. 147 psi	$ 40	$850	Short term dev. Not promising
	PHW — Pressurized Heavy Water	Thermal	Natural Uranium	Heavy Water	Heavy Water	388	440	1064	211			Sphere 20 ft Diam. 800 psi	$118	$560	Short term dev. Heavy water at $80 per lb.
	PLW — Pressurized Light Water	Thermal	Slightly Enriched Uranium	Light Water	Light Water	369	440	1243	246			Cylinder 12 ft D. 39 ft Ht. 800 psi	$ 73	$297	Short term dev.
Bechtel and Pacific Gas & Electric	PHLW — Pressurized Heavy and Light Water	Thermal	Natural Uranium	Heavy Water	Light Water	384	500	500	101	13	11	Not Designed	$ 41	$405	Short term dev. Heavy water assumed to cost $80 per lb.
	FBR — Fast Breeder Reactor	Fast	Highly Enriched Uranium	None	Sodium	600	900	500	145	3	3	Not Required	$ 51	$350	Long term dev. Considerable dev. needed
Monsanto and Union Electric	SGR — Sodium-Graphite Reactor	Thermal	Slightly Enriched U 0.83% 232 tons	Graphite	Sodium	300	605	1000	210	35 (octagonal prism)	20	Not Required	$100	$476	Medium term dev. Some dev. of liq. metal technology needed
			Slightly Enriched U 0.95% 232 tons			300	900	3000	554				$156	$282	
			Slightly Enriched U 232 tons			300	825	675	125	16 (octagonal prism)	15		$ 60	$480	
Detroit Edison & Dow Chemical Co.	Low Melting Alloy Fuel Fast Breeder	Fast	Highly Enriched U or Pu	None	Sodium	400	1000	600	200	3	3	Not Required	Not yet estimated		Long term dev. Advanced design

NOTE: All designs call for plutonium production in addition to electric power. Uranium 238 is the fertile material for all.

Tables Simplify Comparison of Nuclear Power Feasibility Studies

Results of recent industry surveys are made easier to understand by significant listing of critical factors. This resume is therefore essentially a sequel to the "team report" series in the June 1, June 15 and June 30 issues

JOHN W. LANDIS*, formerly U. S. Atomic Commission

When four industry teams recently completed studies of nuclear power plant feasibility, it developed that each had taken a different approach to the problem. Their reports have since been published in these pages (EW June 1, June 15, June 29, 1953).

Essentially, the teams studies methods of utilizing fission energy—that is, energy generated by a fission chain reaction. The basic device used to initiate, maintain, and control a fission chain reaction is a nuclear reactor. It releases heat gradually, not explosively as does a bomb. When a reactor replaces the boiler of a conventional power plant, the result is a nuclear power plant.

The recent announcement by Thomas E. Murray, a member of the Atomic Energy Commission, that the commission will build a nuclear power plant with a capacity of 60,000 kw has focused the attention of the industry on power reactors. It is understood that the reactor to be installed in this plant may be classified as thermal, heterogeneous, non-regenerative, and ordinary coolant.

Because many of the terms commonly used by nuclear scientists in discussing reactors are unfamiliar to industry engineers and completely baffling to the non-engineer, this comparison of the various types has been compiled. This compilation will make clearer the terms most commonly used. However, it is well to remember that other classifications are entirely possible.

* The author is currently associated with Babcock & Wilcox Co, New York, N. Y.

Table II—Fast Reactor vs Thermal Reactor

Fast Reactor . . . utilizes fission neutrons in their nascent state (before they have lost much of their energy) to continue the chain reaction.	*Thermal Reactor* . . . employs a moderator to absorb most of the energy of the neutrons before they are collided with more fissionable material.
• Large fuel investment required	• Small fuel investment required
• Control problems relatively difficult	• Moderator may be expensive
• No moderator needed	• Low power density per unit volume for high-Z moderators
• Fuel diluent must be employed	• Heat removal ordinarily not difficult
• High power density per unit volume	• Wider choice of coolants simplifies heat removal
• Circulating fuel impractical because of high concentration of fuel required	• Small minimum critical mass
• Limited choice of coolants complicates heat removal	
• Large minimum critical mass	

Table III—Heterogeneous Reactor vs Homogeneous Reactor

Heterogeneous Reactor . . . separates the fuel from the moderator and the coolant. Usually the fuel is fabricated in definite shapes.	*Homogenous Reactor* . . . mixes the fuel intimately with the moderator and the coolant—often in the liquid state. A fast reactor has no moderator but it still may be homogenous with respect to the other two elements.
• Fabrication of complex fuel shapes sometimes necessary	• Fuel usually supplied in simplified form
• Chemical processing involves removal of fuel elements with expensive and complicated apparatus, and special handling throughout various processing steps	• Fuel may be processed continuously
• Fission products may build up to dangerous concentrations	• Selective removal of fission products and plutonium possible without handling uranium
• No fuel-circulation corrosion problems	• Fission products do not build up
• Radiation damage may limit burnout	• Corrosion and container difficulties are paramount
	• Fuel may be added continuously to extend burnout

Table IV—Non-regenerative Reactor vs Regenerative Reactor

Non-regenerative Reactor . . . burns nuclear fuel but does not replace it.	*Regenerative Reactor* . . . replaces part or all of the fuel that it burns. If it replaces all that it burns, with or without excess, it is called a *breeder*. The breeder is the ultimate goal of reactor designers, but it requires such large fuel investments that ordinary regenerative reactors may prove to be more *economical* in some situations.
• Useful only in certain power plants where value of fuel consumed is outweighed by unusual advantages of nuclear power	• Reclamation of fuel produced is often expensive
• Burnout limited to 1000 MWD/ton per cycle	• Burnout is limited by products desired, but usually is greater than for non-regenerative case
• Limits nuclear-fuel reserves to between 1/6 and 1/7 energy content of conventional-fuel reserves	• Stretches nuclear-fuel reserves up to 23 times energy content of conventional-fuel reserves

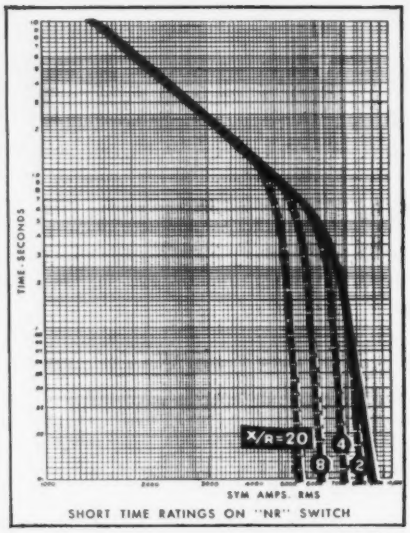
Table V—Ordinary Coolants vs Liquid Metal Coolants

Ordinary Coolants (e.g., Water)	*Liquid-Metal Coolants* (e.g., Sodium)
• Require considerable pressurization for operation at power-plant temperatures	• Permit high-temperature operation without pressurization
• Material is cheap	• Possess higher thermal conductivities but lower heat capacities than does water
• Losses are not important	• Become very radioactive
• Conventional equipment can be used	• Pumping costs are relatively high
	• Special pumps required
	• Special tubing and heat exchangers prevent leaks

L-M's Kyle Type "NR" remote control oil switch—the same switch used in L-M's switched capacitor racks.

"Field-Designed"—with the features users asked for.

200-amperes nominal load rating at 14.4 kv, 150 amperes for capacitor switching. 9000 amperes RMS asymmetrical momentary current rating.



SHORT TIME RATINGS ON "NR" SWITCH

Data 235A

L-M's "NR" Remote Control Oil Switch Provides Low Cost Capacitor Switching

Here is L-M's new motor-operated 200-ampere remote control oil switch. It is specially designed for low-cost capacitor switching up to 3500 kvar 3-phase, but is equally suitable for street lighting, flood and airport lighting, protective lighting, sectionalizing, and other remote control switching applications. Ratings meet users' needs and requirements for capacitor switching and many other applications.

The contact structure is so designed that heavy currents increase contact pressure and give the switch high momentary and short-time current ratings. Spring-loaded contacts give very fast "make" and "break"—which eliminates restrikes and minimizes contact erosion when closing in on large capacitor banks.

The switch can be bolted directly to the pole, or crossarm with a thru-bolt or crossarm-mounted with a clamp-around hanger. Clips also available for mounting on substation steel structure.

Control motor requires less than one ampere at 120 volts, which permits the lightest wiring, simpler control circuit, and gives longer life for limit switches and relays.

Get Full Information

Ask the L-M Field Engineer for details on this new Type NR Switch—or write Line Material Co., Milwaukee 1, Wis. (a McGraw Electric Company Division).

Type "NR" Switch Ratings

SINGLE PHASE

VOLTAGE

Nominal	RMS 14.4 kv
Maximum design	RMS 15.0 kv
60 cycle, one minute withstand, dry	RMS 35.0 kv
60 cycle, ten-second withstand, wet	RMS 30.0 kv
1½ x 40 Ms impulse withstand, crest, BIL	95.0 kv

CURRENT

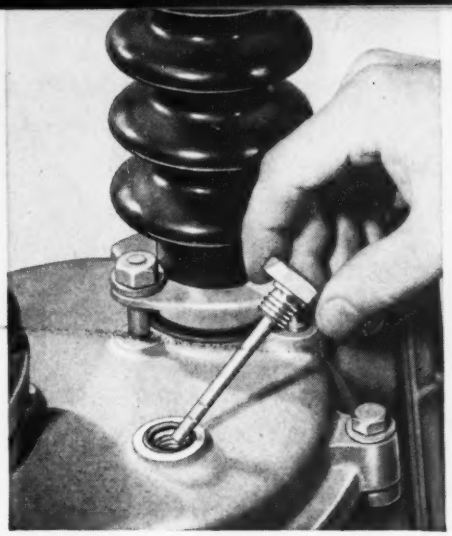
Thermal	200 amperes
Capacitor switching, nominal	150 amperes
Inductive load switching,	
75 to 100% PF	200 amperes
50 to 75% PF	100 amperes
Less than 50% PF	50 amperes
Momentary, RMS Asymmetrical	9000 amperes
Short-time, RMS Symmetrical	
10 seconds	1400 amperes
1 second	4500 amperes

For larger ratings at shorter time intervals see curve, Data 235-A above.

CONTROL

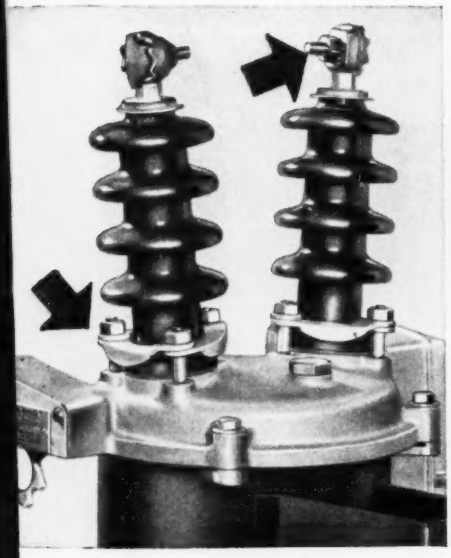
Motor-operated actuator requires less than one ampere at 120 volts. Permits simplest control circuit and gives long life of limit switches and control relays.

Head may be rotated and set at desired position. Lips in the groove on the underside of head hold the gasket so that it doesn't fall out when the cover is lifted.

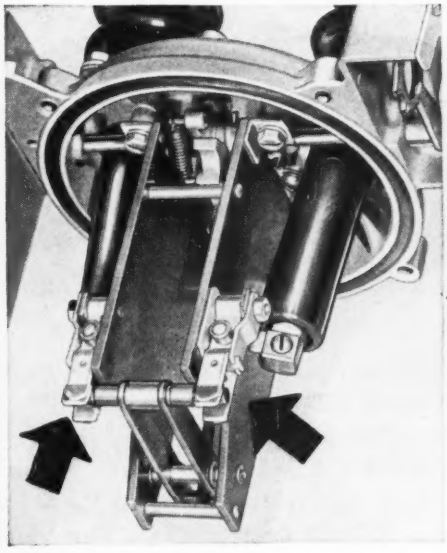


Oil dip stick on the head for checking the oil level. The tank holds 1½ gallons of oil. The inner mechanism is insulated from the tank by the oil and by a tank liner.

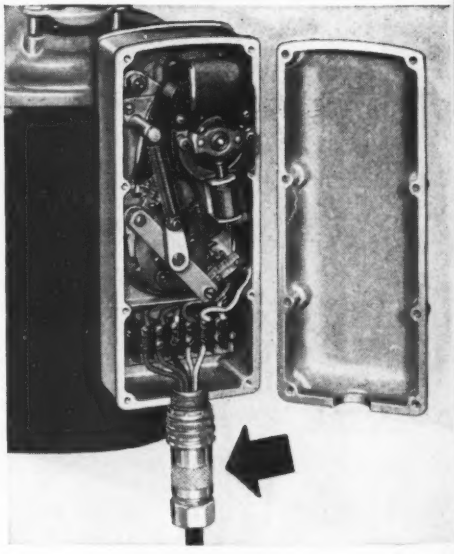
Heavy bracket for direct mounting to pole or crossarm with or without a hanger. Heavy tank, with inserted concave bottom, so that only the rim takes abrasion.



The bushings are the clamp-on type which make replacement easy. Bushings are oil-filled for lowest radio noise level. Plated Universal terminals for aluminum or copper conductor, No. 8 to 2/0.



Contacts arranged so heavy currents increase contact pressure, giving high momentary and short time current ratings. Spring-loaded contacts give quick make and break to prevent restrikes and minimize erosion.



Motor-operated actuator requires less than one ampere at 120 volts, permitting lighter wiring and simplest control circuit, and assuring long life for limit switches and relays. Weatherproof plug-in connection at bottom of box and weatherproof plug available.

CAPACITOR SWITCHING RATING

Voltage	Based on 25 KVAR Units				Based on 15 KVAR Units			
	Three-Phase		Single-Phase		Three-Phase		Single-Phase	
	Bank Size KVAR	No. of Units	Bank Size KVAR	No. of Units	Bank Size KVAR	No. of Units	Bank Size KVAR	No. of Units
2400	600	24	350	14	585	39	360	24
4160	1050	42	625	25	1080	72	615	41
4800	1200	48	725	29	1215	81	720	48
7200	1800	72	1075	43	1845	123	1080	72
12470	3225	129	1850	74	3240	216	1860	124
13200	3375	135	1975	79	3420	228	1980	132
13800	3525	141	2050	82	3555	237	2070	138

LINE MATERIAL
Kyle® Oil Switches

Like all Kyle reclosers, the Type NR switch is filled with ORTO®, L-M's oxidation-resistant transformer oil, inhibited for longer life.

98R

Play it safe!

In maintenance of ELLIOTT motors and generators use only GENUINE ELLIOTT RENEWAL PARTS

Make sure your Elliott motors or generators requiring parts renewal, will perform right up to Elliott standards. Use only parts that really fit the job, made with full knowledge of the specifications and characteristics of the machine. Apply coils correct in form with modern insulation... brush holders of original or Elliott-improved design... brushes of the right grade for the service... oil seals, and sleeve bearings that click into place like the last piece of a jig-saw puzzle.

In major repairs use Elliott factory facilities or the nearest Elliott-approved service shop, **and on all repairs use Elliott parts.** Order through your local Elliott representative or direct to Elliott Company, Ridgway Division, Ridgway, Pa.

Elliott FABRI-STEEL MOTORS AND GENERATORS

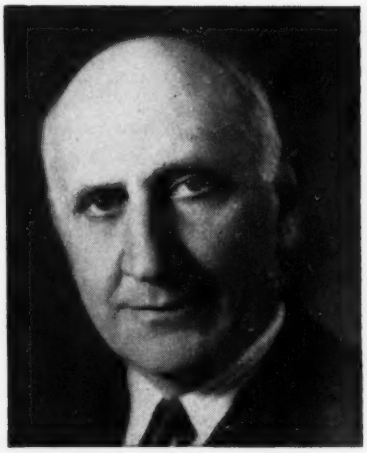
ELLIOTT Company

RIDGWAY DIVISION

FOR MOTORS 1-200 HP. CROCKER WHEELER DIV. AMPERE, N. J.

Cocke Heads Duke Power

Former vice president succeeds the late E. C. Marshall. Robinson named vice chairman of the board



NORMAN A. COCKE, SR

Norman A. Cocke, Sr, vice president of Duke Power Co, has been elected president of the utility to succeed the late E. C. Marshall (EW, Oct. 19, p 214).

The utility also announced the advancement of W. S. O'B Robinson, Jr, vice president and general counsel, to chairman of its executive committee and vice chairman of the board.

Associated with Utility Founder . . . An early associate of the late J. B. Duke, founder of Duke Power, Cocke joined the Duke interests in 1906 as attorney. Cocke has played a major role in the growth of Duke Power and its predecessor companies. He has served as vice president and director of the utility since 1927. He is also vice chairman of the board of trustees of the Duke Endowment.

A native of Prince George County, Va., Cocke attended Petersburg (Va.) Academy and was graduated from New York Law School, New York, in 1905. In 1906 he was admitted to practice law in New York and North and South Carolina.

Robinson, also an attorney, was engaged in private law practice in Charlotte, N. C., before joining the Duke interests in 1913. He has been a Duke Power vice president and general counsel since 1927. He is a trustee of the Duke Endowment. Robinson attended the University of North Carolina and Columbia University and was admitted to the North Carolina bar in 1908.

•

Dr William E. Shoupp, formerly director of development for Westinghouse Electric Corp's Atomic Power Division, has been named assistant division manager in charge of development of the Atomic Power Division. Dr Shoupp joined Westinghouse as a research fellow in 1938 at the Westinghouse Research Laboratories and, until he went to the Atomic Power Division in 1949, held various posts at the Laboratories.

Joel H. Watkins has been named sales manager of transformers and allied products of Kuhlman Electric Co, Bay City, Mich. Watkins, a graduate electrical engineer from the University of Virginia, started his electrical career with General Electric Co in the middle thirties. In 1947 he joined the consulting engineering firm of Slaughter, Saville & Blackburn, Inc, of Richmond, Va. Since 1950 he has been proposal and contract engineer for Miller Hofft, Inc, Richmond.

Dr O. G. Haywood, Jr, has been appointed manager of engineering planning of Sylvania Electric Products, Inc. In his new post, Dr. Haywood will co-ordinate, in co-operation with executives of the operating divisions and research laboratories, Sylvania's engineering planning in the fields of lighting, radio, electronics, and television. Dr Haywood, formerly a colonel in the United States Air Force, headed the Office of Scientific Research of the Air Research and Development Command in Baltimore, Md., until his recent resignation. Previously he served with Los Alamos Scientific Laboratory and AEC.

ERWIN H. WILL

PUAV Elects Erwin Will as Its New President

Erwin H. Will, vice president in charge of operations of Virginia Electric & Power Co, has been elected president of the Public Utilities Association of the Virginias. He succeeds R. E. Hodges, division manager of Appalachian Electric Power Co.

Other officers elected by the association for 1954 included: First vice president, A. J. Bowen, division manager, Northern Virginia Power Co; second vice president, D. B. Potter, vice president, Monongahela Power Co; treasurer, J. C. Parrott, president, Roanoke Gas Co; assistant treasurer, A. T. Ellett, secretary, Roanoke Gas; and executive secretary R. W. McKinnon, Roanoke, Va.

Served as District Manager . . . Will started his career with Vepco, then Virginia Railway & Power Co, in the engineering department in 1922. Later he was transferred to the company's property in Norfolk in charge of the engineering department and was subsequently promoted to assistant superintendent of the electric department. In 1928 he became manager of the Suffolk District of the company.

For 12 years, from 1935 to 1947, Will served as president of El Paso (Tex.) Electric Co. He returned to Vepco in July, 1947 as general manager of operations. In May, 1950, Will was elected to the position of vice president in charge of operations for the utility.

CHARLES S. LUMLEY

Burns & Roe VP

Lumley assumes executive post in firm's newly established Detroit branch

Charles S. Lumley has been named vice president and general manager of Burns & Roe of Michigan, Inc, newly created Detroit branch of Burns & Roe, Inc, New York. The new offices will provide a complete architectural and engineering service for the company's clients in the Great Lakes region.

Lumley, a fellow of the American Institute of Electrical Engineers, brings to the Burns & Roe organization a background of 30 years of architectural and industrial engineering experience. He has served as general manager of Roller-Smith Co, Bethlehem, Pa., and more recently as executive vice president of H. E. Beyster & Associates, Inc.

•

L. W. Byron, residential sales manager for Wisconsin Power & Light Co, has retired after serving the utility for 25 years.

Daniel E. Greene, Jr, has been appointed superintendent of operations for the Central Division of Duquesne Light Co to succeed **W. T. Hawkins,** who has retired. Greene, who joined the company in 1941, has been division engineer in the Central Division for two years.

Allan C. Mustard, Jr, formerly commercial manager for South Carolina Electric & Gas Co, has been named general manager-commercial for the utility's electric operations. Mustard, who started with South Carolina E&G in 1935, was appointed commercial manager in 1950.

Fred Thames has been placed in active charge of the Municipal Electric Light Department of Athens, Ala., until a new permanent manager is hired to replace J. W. Johnson, who has resigned.

C. E. Anderson, formerly director of commercial and industrial sales for the Northern and Western Divisions of Virginia Electric & Power Co, has been named director of commercial and residential sales at Vepco's general offices in Richmond. Anderson was appointed director of commercial and industrial sales in 1944.

Frank Hewens, former newspaper reporter and public relations executive, has been named director of Square D Co's newly created public relations department.

Joslyn Mfg & Supply Co Elects 6 Vice Presidents

Joslyn Manufacturing & Supply Co, Chicago, has announced that four managers of principal subsidiaries of the company and two members of the Chicago executive staff have been elected vice presidents of the parent company.

The new vice presidents are:

R. H. Gasch, vice president and manager, Joslyn Co, New York; R. B. MacDonald, vice president and manager, Joslyn Pacific Co, Los Angeles; E. R. McCoy, sales manager, Joslyn Manufacturing & Supply, Chicago; C. C. McKirahan, vice president and manager, Southern Joslyn Co, New Orleans, and Joslyn Southwest Co, Dallas; T. H. Schaffer, Joslyn Manufacturing & Supply, Chicago; and F. L. Warner, vice president and manager, South East Joslyn Co, Cincinnati.

Joins Washington Group

The newly-created Washington State Power Commission was brought to full strength when Walter S. Gordon, consulting electrical engineer of Tacoma, was appointed as its fifth member.

Gordon joins Bob Jones of Seattle, Thomas Quast of Marysville, Otto Warn of Spokane and Roy Skill of Yakima. The five are expected to agree shortly on appointment of an executive secretary.

F. Milton Ludlow has been elected secretary of Public Service Electric & Gas Co, Newark, N. J., to succeed William H. Feller, who has retired after 48 years' service. Ludlow, who joined Public Service E&G in 1915, has served as chairman of the utility's Welfare Committee since 1944.

James A. Babcock has been made plant manager of Westinghouse Electric Corp's Watthour Meter Plant now under construction at Raleigh, N. C. Babcock, who began with Westinghouse in 1937, formerly was manager of the company's Windsor Manufacturing and Repair Plant in Brooklyn, N. Y., having assumed that post three years ago.

Howard S. Fitch, vice president of West Penn Power Co, has retired after more than 40 years' service with the utility. Fitch, who started his career with West Penn as an engineer in the System Operating Division in 1913, has served successively as assistant system operator, system operator, superintendent of electric operations, and general superintendent of substations. In 1949 he was elected vice president and director in charge of power production.

OBITUARY

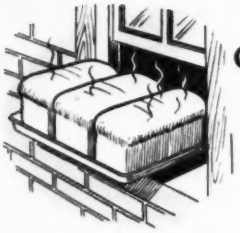
James H. Grant

James H. Grant, retired vice president in charge of advertising for Houston Lighting & Power Co, died in Texarkana, Ark., Oct. 12.

Grant, who joined the utility in 1928, was elected vice president in charge of advertising in 1941. He retired from the company about two years ago.

Carl B. Luscombe, 62, manager of the Vermilion District of Ohio Edison Co, died Oct. 17 at Lorain, Ohio. Luscombe, who entered the utility field 40 years ago, assumed the manager's post with Ohio Edison in 1938.

150 kva, 80° Rise Wagner Dry-Type Transformer that feeds through control center for the automatic bakery's cooling room.



cool oven-hot bread with a transformer?

Certainly—when the bread is cooled in an electrically-controlled cooling room in the world's largest fully automatic bread plant.

The bakery, Mrs. Baird's Bread Company at Dallas, Texas, has just been put into operation. So much electrical equipment is installed that the bakery even boasts its own electrical repair shop!

The task of supplying electricity, at proper voltages, to the mixers, the oven room, the cooling room, and for the lighting and other small power loads is handled by forty-five Wagner three phase dry type transformers, in sizes from 5 to 150 kva.

These Wagner dry type Transformers solve many problems for industry. They put the right voltage right at the load. They meet all safety requirements for indoor installation. They are easy to install and easy to move whenever changes in plant facilities make it necessary. And, they require practically no maintenance.

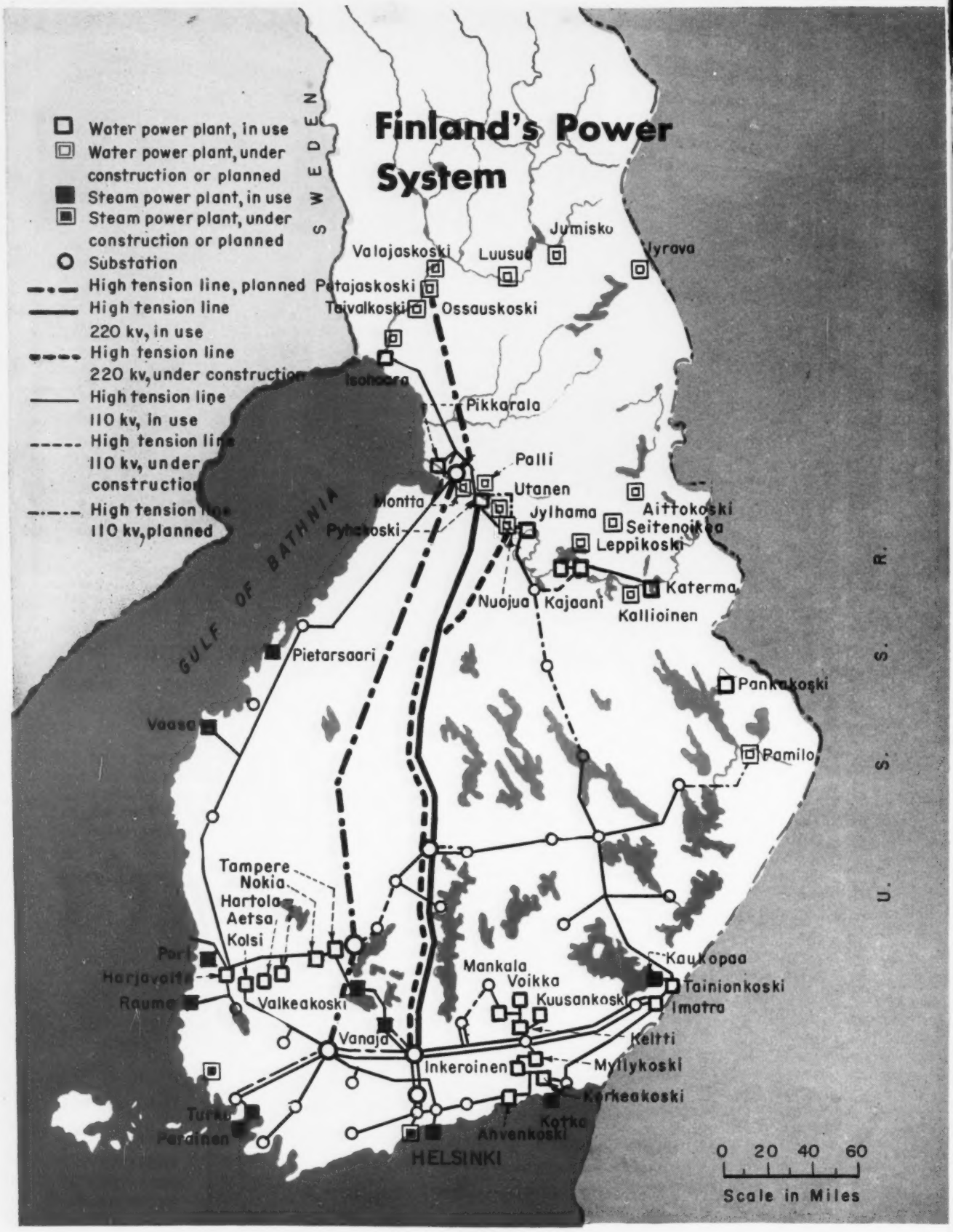
Your nearby Wagner engineer can help you select the *right* power or distribution transformers for your needs. Call the nearest of our 32 branch offices, or write us.

WAGNER ELECTRIC CORPORATION
6456 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE
BRAKE SYSTEMS—
AIR AND HYDRAULIC

WT53-7


Finland's Power System
Water power plant, in use
Water power plant, under construction or planned
Steam power plant, in use
Steam power plant, under construction or planned
Substation
High tension line, planned
High tension line 220 kv, in use
High tension line 220 kv, under construction
High tension line 110 kv, in use
High tension line 110 kv, under construction
High tension line 110 kv, planned
SWEDEN
GULF OF BATHNIA
U. S. S. R.
Valajaskoski
Petajaskoski
Taivalkoski
Ossauskoski
Luusua
Jumisko
Jyrava
Isohaara
Pikkarala
Palli
Utanen
Jylhama
Aittokoski
Seitenoikea
Leppikoski
Katerma
Kallioinen
Nuojua
Kajaani
Pyhaeoski
Montta
Pietarsaari
Vaasa
Pankakoski
Pamilo
Tampere
Nokia
Hartola
Aetsa
Kolsi
Pori
Harjavalta
Raume
Valkeakoski
Vanaja
Mankala
Voikka
Kuusankoski
Kaukopaa
Tainionkoski
Imatra
Keltti
Inkeroinen
Myllykoski
Korkeakoski
Kotka
Anvenkoski
Turku
Parainen
HELSINKI
0 20 40 60
Scale in Miles

HYDROELECTRIC PLANTS like Pyhakoski on the Oulu River are replacing capacity lost to the Russians in World War II

Finland Looks North to Power

At the end of the Russo-Finnish War the Soviet Union took away nearly one third of Finland's existing generating capacity in annexing territory at the extreme southeast.

So now Finland has turned north for power. Within the next few years she will build seven hydro plants on the Kemi River, which has the largest power potential in the country. Its main course is estimated to produce about 3.5 billion kwhr and its tributaries 1.5 billion kwhr a year, or about one third of the entire water power resources in the country.

War Setback . . . After the war, rebuilding of the electrical supply became one of Finland's chief difficulties. This was much hindered by shortages in material and machinery. Power generating equipment had to be shipped in from abroad, and this in itself was time-consuming. To top it off, a severe drought during the years 1946-1948 lowered the effect of hydro plants and made it necessary to regulate the use of power throughout the country.

In 1949-50 the situation was brought back to normal. Flow quantities in the streams increased. The effects of the building programs began to make themselves felt, bringing the figures in 1951 finally up to almost 4.5 billion kwhr per year of which water power comprised 83%, back-pressure power 9% and condensing steam-power 8%.

But the use of power has increased about 10% yearly. Capacity had to be increased at a high rate to meet the growing need. To do this several building programs have been undertaken. These programs include:

Vuoksi River: rebuilding of Tainionkoski, extension of Imatra. **Kymi River:** rebuilding of Kuusankoski, Mankala. **Kokemäki River:** Kolsi, Hartola. **Oulu River:** Merikoski, Pyhäkoski (above) and Jylhämä.

Onto River: Katerma. The program is planned to comprise 28 turbo generators to give a total output of 398 Mw and an annual energy production of 2.155 billion kwhr per year at medium flow. These plants are to be completed by 1954.

Look North . . . The entire water power resources in Finland are an estimated 15 billion kwhr of energy per year. This figure may rise with the advancement of construction methods. Most of the advantageous rapids of South Finland have already been harnessed and large power production plans are being carried out in the northern parts of the country. The Oulu River will be totally taken into service in 1956 when it will have the new plants of Montta, constructed for an output of 45 Mw and an energy production of 210 million kwhr/year; Pälli, 45 Mw and 230 million kwhr/year; Utanen, 53 Mw and 270 million

kwhr/year and Nuojua, 75 Mw and 390 million kwhr/year. These plants will consist of three generating sets each, with a total power output of 218 Mw and a yearly energy production of 1.1 billion kwhr. Jumis River will have Jumisko Power Station with one unit laid out for 26 Mw and 100 million kwhr/year, and Koita River, Pamilo, with two units totalling 50 Mw and 230 million kwhr/year.

Of the seven plants Finland planned to build on the Kemi as a means of overcoming her losses to the south, Isohaara has already been completed (see map).

New Company Formed . . . To achieve most effective construction results, a new concern named Kemijoki Oy has been founded recently. The company, which is state-owned by better than half of its share capital, commenced its activities at Petäjäskoski where a plant with a 65-ft head is being built to produce a power output of 120 Mw and an annual energy production of 550 million kwhr/year. The next project built will be Luusua where a 230 ft waterfall will be concentrated to give a yearly production of 1.2 billion kwhr and a power output of 240 Mw by the means of tunnels and open channels.

Total capital invested in the power stations to be finished by the end of this year amounts to approximately 21 billion marks (US $1 = Mk 231), which means an average cost of about 53,000 Mk (about $229) per kw. The capital required for the construction of power plants and transmission lines to be completed later this year, excluding the building of Luusua, has been estimated at approximately 35 billion marks ($151,515,151).

Industrial plants using large quantities of process steam have found it advantageous to generate electrical energy by means of economical-to-run back-pressure turbine generator units. The total output of back-pressure plants now existing in the country is an approximate 100 Mw and about 550 million kwhr/year, but turbines have been ordered for 18 new back-pressure plants already under construction. These plants will stand ready for use in 1952-54. The demand for condensing steam-power plants, which are needed to cover power shortage during the periods of low-water and machine faults, is estimated to amount to about 520 Mw in 1955. The plants existing now are capable of generating about 300 Mw. Turbines for new plants have been ordered to cover shortages.

The power construction programs now being carried out in Finland will provide more than 20 years of labor for thousands working on the projects and in the factories where power producing machinery and supplies are being built. Beyond that the programs will do much to promote the economical advancement and welfare of the country.

Oh, the Monkey Wrapped His Tail . . .

. . . around a hot line

MONKEY, resting from his travels, sits serenely on 12.5-kv circuit as Kansas Gas & Electric lineman attempts rescue

The story you are about to hear is true. Not even the names have been changed to protect their owners.

My name is Karsten. I'm a lineman. I work out of the Median Station of Kansas Gas & Electric Co. My partner is Max Hein.

One morning my partner and I were driving east on a gravel road going west from the station house toward El Dorado. We saw him up there on the 104 (our 12,500-v circuit). He was making his way from pole to pole. I looked at Max. Max looked at me. It was a monkey.

Down the road we spied a young lady. She was carrying a small quilted comforter—a monkey comforter. It was obvious she was the monkey's owner.

I played a hunch. We deenergized the line and pitched a handline over it to try and shake him off. We failed. The monkey was an acrobat. He jumped toward a neutral. He missed, fell to the ground, and was picked up.

The monkey was tried and found wanting and returned to his keeper. Hanging on hot lines in Kansas is punishable by not less than two nor more than 300 hours without bananas.

RETURNED safely from his capers on the hot line, monkey is wrapped in his comforter held by a member of the line crew

A STATION ENGINEER ASKS—

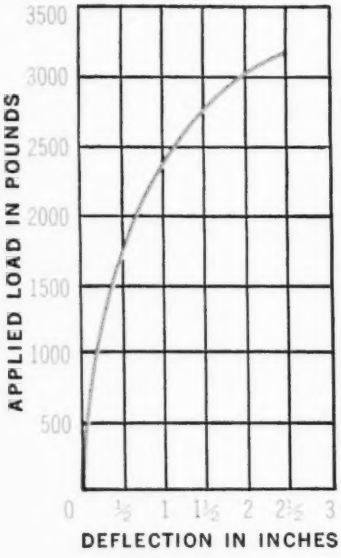
"Why is it necessary to shim 69 K.V. switch units ?"

Here's the ANSWER: *You don't have to when you use Pinco L-6069 Switch and Bus Units.*

Here's WHY:

The Pinco L-6069 Switch and Bus Unit employs a ribbed malleable iron pin to give it the rigidity and strength required in this unit's application.

Here's the PROOF: The deflection curve below shows the rigidity of the Pinco L-6069 Switch and Bus Unit under various loads. The secret of Pinco's perfect alignment even when horizontally mounted, lies in the balanced design of the porcelain and hardware.



SPECIFICATIONS

PINCO L-6069
SWITCH and BUS UNIT

Cantilever Strength, upright (Base mounted)	1500 lbs.
Cantilever Strength, underhung (Cap mounted)	1000 lbs.
Torsion Strength	15,000 inch lbs.
Tension Strength	12,000 lbs.

This Unit More Than Meets The Above Ratings

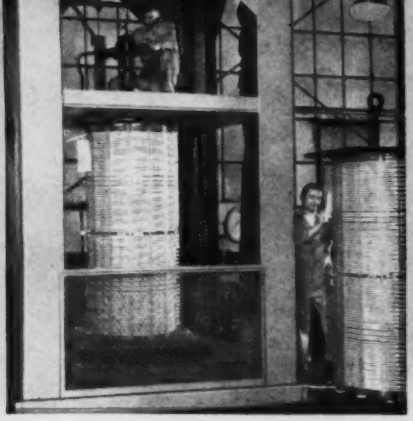
SEE PAGE 116, PINCO CATALOG NO. 49 FOR COMPLETE ELECTRICAL AND MECHANICAL CHARACTERISTICS

PINCO INSULATORS

RIGHT ON THE JOB!

The Porcelain Insulator Corporation
766 Main St., Lima, N. Y.

Sales Agents: **JOSLYN MFG. & SUPPLY CO.**
Offices in Principal Cities



1 **LOW THERMAL GRADIENTS** and high insulation strength are assured by well-designed duct system which provides free circulation of insulating and cooling medium in the coil assembly of Allis-Chalmers power transformer.

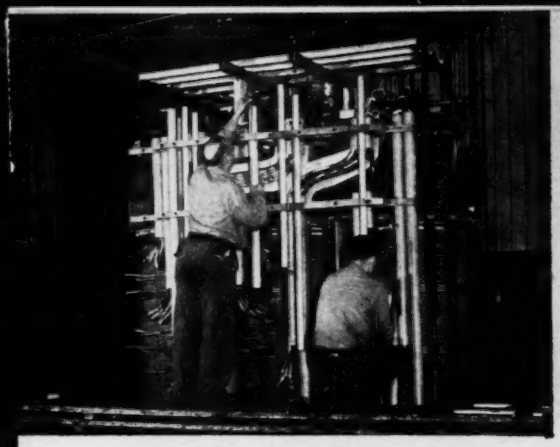
2 **PRE-COMPRESSED COIL STACKS** give added strength. Special press compresses high voltage coil stacks to exact dimensions to withstand the maximum short-circuit forces which may occur in service.

3 **PATENTED LOCKING ARRANGEMENT** keeps coils in perfect alignment after they are guided into place, holding them uniformly and permanently spaced with regard to insulation barriers and each other.

ALLIS-CHALMERS POWER Transformers

5 REASONS

Transformers



4 **EXPERIENCED ASSEMBLYMEN,** like those above, take extreme pride in their workmanship. The result is a transformer of high quality and excellent appearance. In the operation shown above, high insulation strength and excellent support of leads are being attained through use of machine wound tubes anchored by maple supports bolted to the side frames.

5 **MODERN TEST EQUIPMENT** checks transformer performance against design specifications after all manufacturing operations are complete. All tests are made in strict compliance with NEMA and ASA standards. As a result of all these special processes and necessary test equipment, you can expect the longest possible transformer life with minimum maintenance costs.

WHY *Last Longer*

REAL COST of any equipment is the initial price *plus* the upkeep. When you buy a transformer, you want assurance in advance that its operating life will be as trouble-free as possible. That's where the five points shown above come in. They give you some of the reasons why you can count on Allis-Chalmers power transformers for dependability.

For more than half a century, Allis-Chalmers has been developing the special equipment and processes as well as a seasoned team of craftsmen for building transformers that provide maximum reliability through many long years of service. All this adds up to assurance that with an Allis-Chalmers power transformer on your system, you will be able to hold upkeep costs to a minimum.

These unique devices and special processes are just a few of the reasons it will pay to investigate Allis-Chalmers design and construction when you consider your next power transformer. A-4071

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

Milwaukee 1, Wisconsin

for the first time

PROOF

HD

KEARNEY

Specify

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO. GUELPH, ONT.

JAMES R. KEARNEY CORPORATION

4224-42 Clayton Ave.,
St. Louis 10, Missouri
Canadian Plant: Guelph, Ontario

*Taken at random from the regular production line

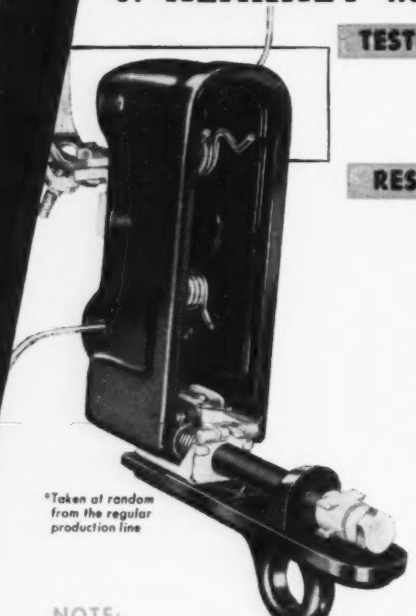
TEST: A standard, 100 ampere, 15 KV HEAVY DUTY TRIP-OUT* (16234-3) was subjected to faults made on the 15 KV side of a 10,000 KVA transformer.

RESULTS: At 14.4 KV with a 20% power factor, the cutout successfully interrupted six shots ranging from 7620 to 8750 amperes, RMS. After the sixth shot, the cartridge and contacts were carefully examined and found to be in perfect working condition.

After the short circuit test, without any adjustment, the cutout was tested for temperature rise. The maximum found was 13°C., as compared to the 30°C. allowed by NEMA on new cutouts.

FIELD TESTS DEMONSTRATE

Ample Heavy Load Interrupting Capacity of KEARNEY Heavy Duty Cutouts



*Taken at random from the regular production line

TEST: Two standard, 100 ampere, 5 KV TRIP-O-MATICS* (indicating 12143-20 and non-indicating 12143-21) were subjected to faults on the 5 KV side of a 10,000 KVA transformer.

RESULTS: At 5 KV with a power factor of 20%, the indicating Trip-O-Matic successfully interrupted nine shots, ranging from 5500 to 6350 amperes, RMS, at 5046 volts. Three additional tests were made on the same box with a new door installed, successfully interrupting 5800, 5750 and 6050 amperes. The non-indicating Trip-O-Matic successfully interrupted four shots ranging from 2800 to 6000 amperes.

After the short circuit test, a heat run was made on the same non-indicating box. Maximum temperature rise was found to be 21° C., as compared to the 30° C. allowed by NEMA on new cutouts.

These test results are proof-positive that Kearney cutouts protect your circuits with *even greater* capacity than their normal ratings.

NOTE:

These reports are NOT BASED ON CALCULATION! They are the results of actual field tests at Kearney's 34.5 KV substation. Power was taken from the Union Electric circuit providing a 445,000 KVA backup.

JAMES R. KEARNEY

FOR BETTER CONSTRUCTION • FOR SAFER MAINTENANCE 244

Appliance Sales vs Inadequate Wiring

FRANK R. INNES, Associate Editor

Will sales of electricity to residential customers in the years ahead continue to increase at a rate equal or comparable to that since the war?

A lot of money is riding, and more will be riding, on the prospect that they will.

This money is, and will be, invested in manufacturing capacity for production of electric appliances.

Makers of electrical goods are betting that residential electricity sales will keep on increasing at a rapid rate.

Is it a good bet?

Let's look and see.

Sixteen years ago, in 1937, about 18 billion kwhr were used in the homes of America.

Last year, the figure was 87 billion.

In 1963, ten years ahead, it will be 226 billion, according to estimates published in Electrical World, September 21, of this year.

By itself, this increase in residential use of electricity is something to think about.

It becomes even more significant by comparison with the rise in total sales of electricity.

Taking 1937 as the base of 100, the index of residential energy sales in 1952 is 491 while that of total sales is 345.

From 1937 through 1945, residential and total sales increased at the same rate. Both rose to 195 in 1945.

After the war, residential sales began to rise faster.

Ahead to 1963, the residential sales index is estimated to become 1,278 and that of total sales to reach 768.

All estimates are based on assumptions.

The basic assumption in respect to residential energy sales is that a continually enlarging market for major electric appliances will continue to exist.

But we have no positive assurance that it will do so.

The record of the past three years warns us that it may not.

From 1950, ranges sales in 1952 down 42%.

Refrigerator sales also down 42%.

Water heater sales down 27%.

Food waste disposer sales down 14%.

Dishwasher sales down 9%.

Electric housewares sales down 13%.

1953 appliance sales will probably be above 1952, but not enough to cheer about.

Up to now, the increase since the war in use of electricity in the American home has been mostly a sort of fill-in.

A fill-in of demand that neither utilities nor appliance makers did very much to create.

It was a demand that arose from the scarcities of the war years, from a general rise in income level, particularly in the lower brackets, and from new housing catching up with population growth.

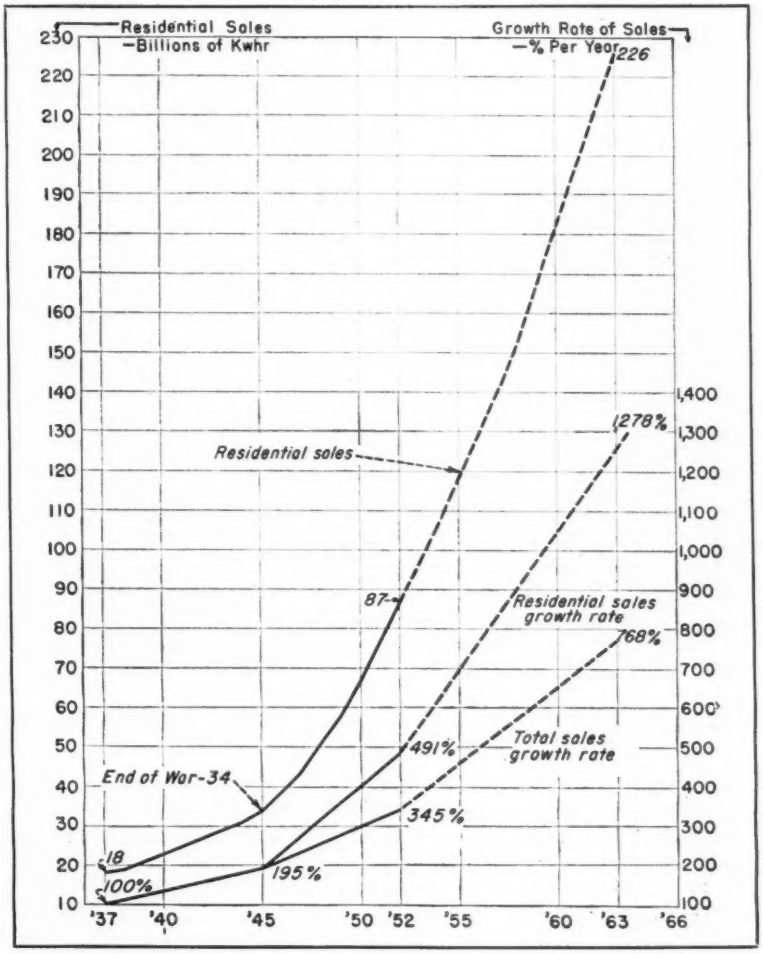
That it was such a demand is plainly apparent from the record.

About three fourths of the 15-year rise in residential use of electricity occurred in the 7 years since the war.

This demand now is largely satisfied.

It will not make the future market.

Another, a new, demand must take its place.



UP, UP AND UP go residential energy sales since the war, faster than total sales. But will the solid lines follow the dotted ones in the years ahead?

It will have to be created by utilities and makers of electrical goods among people living in homes 5, 10, 20 even 30 or more years old.

Among people who are pretty well satisfied with what they have, in whom desire for the comfort, convenience, labor-saving, the all-around greater amenity of electrical living, will have to be instilled.

This is a potential market much larger than that of the years since the war.

The size of this potential market is shown by figures generally known—

- 32 million homes without electric ranges,
- 36 million without electric water heaters,
- 41 million without food waste disposers,
- 41 million without clothes dryers,
- 41 million without dishwashers,

And so on down the list.

These millions of "withouts" are the homes connected with two-wire services and wired with #14 copper.

They present the immense problem of inadequate wiring and cost of appliance installation that must be dealt with if the market in them is to be transformed from potential to actual.

Here are some intimations of the problem—

Letters from landlords to apartment house tenants prohibiting room air conditioners and ordering out any already installed—

Complaints to utilities that the TV set goes haywire when an appliance is plugged in—

Spreads from $4 to $175 in the cost of installing an electric range, and like spreads in other appliance installation costs—

This adds up to one simple fact. It is that a tremendous obstacle lies in the way of continuing progress of electrical living, in the way of continuing increase in sale of electrical goods and of electricity.

We can call this obstacle inadequate wiring, but its real name is apathy. Although it has been seen and recognized for many years, nothing much has been done about it.

We all know the thousand and one reasons why nothing much has been done.

The time is now at hand when we must decide that the reasons why nothing much has been done are not reasons why much more can't be done.

The little that has been done is the work of the National Adequate Wiring Bureau and of the local bureaus chartered by it.

Responsibility for the local bureaus is most largely on the utilities.

If the utility does not take the lead in local promotion of adequate wiring, there is no promotion.

And if the utility does no more than make motions in that direction, results are small or nil.

And that, too often, is the case in the 65 local adequate wiring bureaus scattered around the country. Here's why.

The immediate benefit to the utility from adequate wiring promotion is very little.

The benefit is long term, is spread over many future years.

It is quite natural that effort towards long-term results should be secondary to more pressing considerations.

And the utilities have plenty of pressing considerations these days.

It takes from 10 to 50 years for the utility revenue from a given appliance to equal the price of that appliance.

Who, then, gets the immediate benefit from promotion of adequate wiring?

The makers and sellers of electrical goods, of course.

It is logical that the utility should be the leader, organizer and prime mover in local promotion of adequate wiring.

Utilities must do more, a great deal more, than they have been doing to persuade their customers of the need for enlarged electrical facilities in the home.

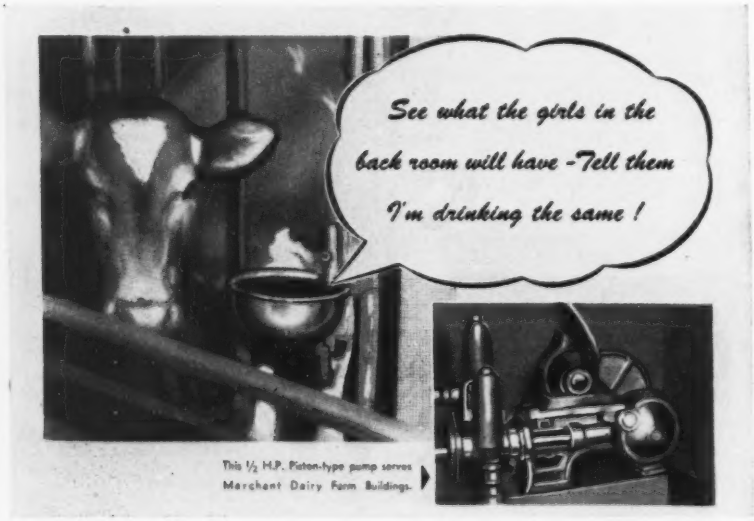
But the utilities cannot be expected to do that great deal more promotion of themselves and at their own expense.

Those to whom accrue the immediate rewards of adequate wiring must move more largely into local promotion of it.

They must put more money, more personnel, more enterprise, more enthusiasm, into local adequate wiring promotion.

This imperative lies particularly on the makers and sellers of appliances.

If they ignore it, the future market for their goods will be much smaller than they are betting it will be.


See what the girls in the back room will have -Tell them I'm drinking the same !
This ½ H.P. Piston-type pump serves Marchant Dairy Farm Buildings.

Keeping 'em Filled Up in the Back Room

The jocular phrase "See what the girls in the back room will have" always attracts attention. "The girls" here refers to 45 milk-producing cows in a dairy barn. They drink the same—water at the rate of 25 gal per cow per day. In addition enough water is needed for the chores plus 1,200 laying hens. That is a total of 1,200 gal or 5 tons per day required. The water supply job is done by an automatically controlled motor-driven pump for less than 4 cents a day throughout the year. This is one of Atlantic City Electric Co messages that M. O. Whitehed, the company's rural supervisor, presents in advertisements in a rural selling program.

Safety Depends on Attitude . . .

. . . A. S. King, Northern States Power executive vice president, tells conference sponsored by Ebasco for client companies

Delegates from all over the United States and South America attending the Annual Safety Meeting of Ebasco Client Companies heard Allen S. King, executive vice president of Northern States Power Co, stress the importance of attitude in promoting safety.

Approximately 200 delegates representing 60 companies attended the conference at Chicago, Oct. 19-21.

In an address entitled "Safety Depends on Attitude," King analyzed the frequently incorrect attitudes of management, supervisors, foremen, and workers toward safety. He pointed out that all too often safety is looked up as a statistic, a record to be maintained, or a set of rules. Such attitudes, said King, are fallacious.

Panel Discussions . . . Following King's talk, a panel discussion was held on the subject "Does Attitude Control Accidents?" Panel members, discussing the subject from various standpoints, answered the question in the affirmative. S. C. Harrelson, Jr, foreman, Carolina Power & Light Co spoke as "The Man on the Job"; Thomas F. Estes, foreman, United Gas Pipe Line Co, as "The Foreman"; C. H. Kirk, superintendent of transmission and distribution, Montana Power Co, as "The Superintendent"; and G. C. Rawls, vice president in charge of operations, Louisiana Power & Light Co, as "The Manager." W. F. Brown, safety director, Consolidated Edison Co of New York, acted as moderator.

Another panel discussion was held on "Principal Factors in Accident Control." William Ismay, personnel manager of Arizona Public Service Co, was moderator. Panel members analyzed accident control factors from different viewpoints: "Employment" by C. E. Jones, Mississippi Power & Light Co; "Orientation" by F. M. Keith, Dallas Power & Light Co; "Training" by Dr G. C. Carter, University of Illinois; and "Supervision" by Perry Davis, Texas Electric Service Co.

Objectives for Utilities . . . In a general speech, H. B. Sargent, president, Arizona Public Service Co, told the delegates to the safety conference that the outlook for the utility industry is more favorable under the present Administration in Washington. He warned that utility people must not look upon this as a time for complacency, but as an opportunity for reevaluation and rededication. Among the objectives he outlined for the utility industry were improvement of personnel and public relations, long range construction and financing programs, and greater acceptance of individual responsibility by everyone in the industry with regard to their work and their country.

Awards . . . W. T. Rogers, safety consultant for Ebasco, announced results of the 1952-53 Ebasco award program. In the client company group the top award, a gold plaque, will be presented to Washington Water Power Co, and a second place award, a silver plaque, to Texas Electric Service Co. For performance at least 25% better than the national average, Certificates of Achievement will be presented to Utah Power & Light Co, Louisiana P&L, Carolina P&L, and Dallas P&L.

Opposes Interest Hike

Rural Electrification Administration is against any increase in the 2% interest rate on government rural electrification loans. Main reasons: An increase would make it more difficult to electrify the hard-to-reach farms still without electricity. Interest collected from REA borrowers has been sufficient to cover interest paid by the government on long-term borrowings.

Work Is Started on Arapahoe Addition

With the Arapahoe Plant in the background, officials of Public Service Co of Colorado look over plans for a 100,000-kw addition to the plant. Pictured from left to right are Robert F. Throne, superintendent of Public Service steam plants; Ben Snow, construction superintendent, Ebasco Services, Inc; John E. Loiseau and M. M. Koch, president and vice president, respectively, of Public Service. Construction of the addition is now under way.

The new 100,000-kw unit will be enclosed in an extension on the west side of the Arapahoe plant and is slated for completion in July 1955. Plant capacity then will be 232,000 kw.

Not just a little more Protection...

Much More!

O-B Announces New THOREX® Multi-Purpose Lightning Arrester

Passing all American standards for heaviest duty, not only with ease but with great un-used reserve, the Thorex Multi-Purpose, Type MP, lightning arrester introduces a new order of protection and durability.

Long-duration disturbances occurring on extra-high voltage networks, in connection with large underground cable installations, or initiated by heavy static capacitor banks, cannot over-tax the great thermal capacity of the new Thorex.

Compared to previous station protective devices, this arrester offers a reduction in IR discharge voltage of 10 to 15 per cent. Combined with protective tolerances not exceeding +5% IR discharge and +10% sparkover voltages, a radically wider protective margin is established between maximum arrester performance and minimum apparatus insulation strength.

In all voltage ratings from 3 kv to ranges above 300 kv, the new Multi-Purpose Thorex requires no auxiliary bracing or support. In the higher ratings, this feature offers major savings in installed cost.

At 90 kv rating, and above, a special non-linear resistance is in parallel with the functioning elements. In addition to the linear series grading resistors, this maintains substantially uniform voltage division between units in the stack, regardless of semi-conductive surface contamination.

When you investigate the whole story of the new Multi-Purpose Thorex, you will see for yourself it offers *not* just a little more protection, but MUCH MORE!

Ohio Brass

MANSFIELD OHIO, U.S.A.

4402-H

Westinghouse's Peak Sales Boost Income for 9 Months

Westinghouse Electric Corp's net sales for the first nine months of 1953 were the highest for any comparable period in the company's history. Net sales for that period were $1,163,588,000, up 11.5% over the sales of $1,043,861,000 for the first nine months of 1952.

Net income for nine months was $53,219,000 compared with $48,741,000 in the same period of 1952. This net income for 1953 is equal to $3.26 a common share, an increase of 7.9% over the $3.02 earned per common share in the like period of 1952.

For the third quarter of 1953, net sales of $383,049,000 represented an increase of 5.7% over the sales of $362,483,000 in the third quarter of 1952. Net income for the third quarter was $17,559,000 compared with $17,233,000 in the like period of 1952, an increase of 1.9%. Net income per common share in the third quarter remained unchanged at $1.07 from the corresponding period a year ago.

President Gwilym A. Price reported that all four major product groups showed sales increases with the Consumer Product Division reporting the sharpest rise. The company's other manufacturing groups are: Apparatus, general industrial, and defense.

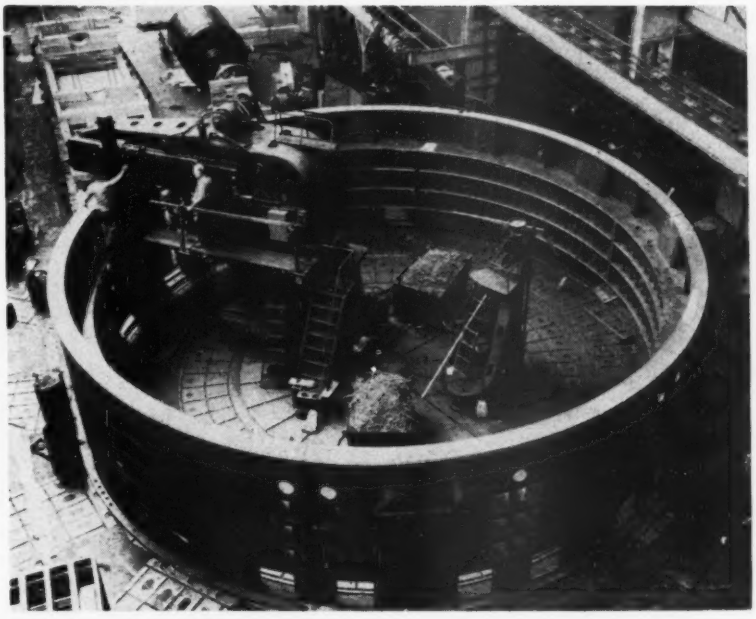
Allis-Chalmers' Sales Up, Income Is Cut 15%

Sales of Allis-Chalmers Manufacturing Co showed a slight increase for the first nine months of 1953 compared with the same period for 1952, but earnings dropped about 15%. W. A. Roberts, president of Allis-Chalmers, said the profit decline reflected increases in both labor and materials costs.

Net sales amounted to $391,143,992 as compared with $384,600,892 in the nine-month period in 1952.

Net income for the first nine months of 1953 was $15,150,429, equal to $4.83 per common share, compared with $17,752,677, equal to $5.99 per common share in 1952.

Third quarter net income for 1953



Stator Readied for McNary Generator

Stator frame of a 73,684 kva hydraulic turbine driven generator for McNary Dam on the Columbia River is shown on a 60-ft vertical boring mill in the Large Motor and Generator Department of the General Electric Co in Schenectady, N. Y. The unit, which will be disassembled into six parts for shipping and be reassembled at the installation site, will be the third of 12 which G.E. is supplying for the project. First two generators are being installed and are slated to be placed in operation before the end of the year.

MANUFACTURERS' EARNINGS

Company	Period Months	Period Ended	Net Income 1953	Net Income 1952	Earnings Per Common Share 1953	Earnings Per Common Share 1952
Allied Chemical & Dye	3	Sept.	$12,019,362	$9,075,371	$1.36	$1.02
Allied Chemical & Dye	9	Sept.	33,738,809	29,709,142	3.81	3.35
Allis-Chalmers	3	Sept.	4,697,061	6,242,370	1.50(a)	2.11(a)
Allis-Chalmers	9	Sept.	15,150,429	17,752,677	4.83(a)	5.99(a)
Aluminum Co of America	9	Sept.	40,141,929	30,650,007	3.90	2.94(c)
Baldwin-Lima-Hamilton	9	Sept.	5,519,786	4,967,552	1.15	1.04
Blaw-Knox	3	Sept.	1,085,040	993,030	.77	.70
Blaw-Knox	9	Sept.	3,056,927	2,865,881	2.17	2.03
Bridgeport Brass	3	Sept.	1,547,235	805,885	1.62	.85
Bridgeport Brass	9	Sept.	4,422,009	2,717,751	4.63	2.86
Combustion Engineering	9	Sept.	5,585,092	3,733,300	5.79	3.87
Cooper-Bessemer	9	Sept.	1,517,000	1,864,000	2.79	3.33(b)
Driver-Harris	3	Sept.	152,412	76,036	1.71	.85
Elliott	9	Sept.	1,935,175	2,016,676	3.20(a)	3.80(a)
Federal Electric Products	12	June	1,317,107	.....	2.42	....
General Cable	9	Sept.	3,906,231	3,618,489	1.76	1.61
Kaiser Aluminum & Chemical	3	Aug.	1,214,545	1,828,407	.26	.42(b)
Koppers	9	Sept.	6,678,550	6,887,033	3.34	3.45
Motorola	3	Sept.	1,536,158	949,558	.79	.49
Motorola	9	Sept.	6,176,837	4,079,262	3.19	2.11
National Supply	9	Sept.	7,026,751	6,711,659	4.55	4.33
National Vulcanized Fibre	3	Sept.	305,754	44,545	.58	.08
National Vulcanized Fibre	9	Sept.	772,438	387,424	1.45	.73
Orangeburg	12 wks	Sept.	148,041	98,439	.93	.65
Orangeburg	36 wks	Sept.	429,084	307,499	2.71	2.03
Pittsburgh Coke & Chemical	3	Sept.	680,000	430,000	.63	.35(b)
Pittsburgh Coke & Chemical	9	Sept.	2,483,000	1,426,000	2.39	1.23(b)
Radio Corp of America	3	Sept.	6,966,790	6,547,180	.44(a)	.42(a)
Radio Corp of America	9	Sept.	25,152,018	17,847,110	1.62(a)	1.12(a)
Remington Rand	6	Sept.	5,325,769	6,827,794	1.01(a)	1.31(a)
Scovill	9	Sept.	3,254,564	2,066,265	2.35	1.37
Stone & Webster	9	Sept.	4,187,204	4,522,075	1.99	2.15
Westinghouse Electric	3	Sept.	17,559,000	17,233,000	1.07	1.07
Westinghouse Electric	9	Sept.	53,219,000	48,741,000	3.26	3.02
Weston Electrical Instruments	9	Oct.	825,395	810,080	1.93	1.89(b)

Notes—(a) Based on shares outstanding at close of the period; (b) Based on shares now outstanding; (c) Adjusted to give effect to two-for-one stock split of April, 1953.

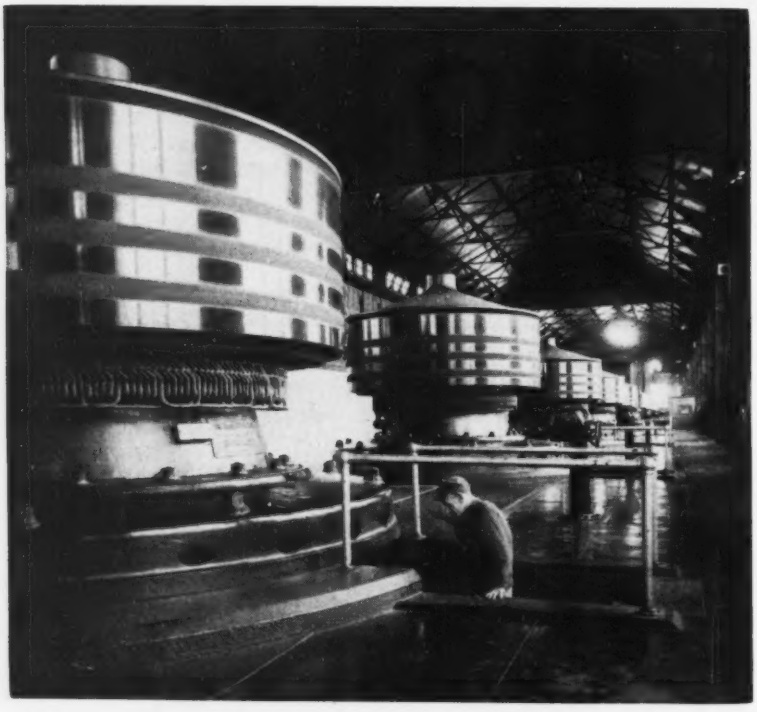
totaled $4,697,061, equal to $1.50 a common share, against $6,242,370, equal to $2.11 a common share, for the corresponding period in 1952. Net sales for the third quarter of 1953 amounted to $132,577,316 against $117,459,005 for the same period in 1952.

MANUFACTURING BRIEFS

English Electric Export & Trading Co, a British concern, has entered the low bid of $3,651,476 for two 73,684-kw generators for McNary Dam on the Columbia River. Col F. S. Tandy, Walla Walla (Wash.) district engineer for the Army Corps of Engineers, has explained that the bid must be referred to the Secretary of the Army for his recommendation because it was entered by a foreign firm. Other bidders were all U. S. firms. Project calls for design, manufacture, installation, and testing of the two units.

Allis-Chalmers Manufacturing Co has officially assumed operation of Buda Co, 72 year old Harvey, Ill., firm which builds diesel and gasoline engines, fork lift trucks, and industrial plant tractors. Ralph K. Mangan, president of Buda, will continue as president and general manager of the A-C addition, which will operate as the Buda Co, a division of Allis-Chalmers. Transfer of Buda assets to Allis-Chalmers was at the rate of one share of its common stock for each 2 1/6 common shares of Buda.

American Cross Arm Co plans to open a $200,000 plant in Denver, Colo., to manufacture utility pole crossarms for marketing in 36 states east of the Rockies. It will be called the Great Western Cross Arm Co.



Generators Celebrate 58th Birthday

The three generators shown in foreground started operating 58 years ago in the world's first large power installation, the Edward Dean Adams power station of Niagara Mohawk Power Corp. Built by Westinghouse Electric Corp, the generators, rated at 5,000 electrical horsepower, are still in service today. Installation of the three units was completed two years after Niagara Falls Power Co, now part of the Niagara Mohawk Power, and Westinghouse signed contracts in 1893 for the construction and installation of three alternating current waterwheel generators in the Adams station.

MEETINGS CALENDAR

***National Electrical Manufacturers Association**
Annual Meeting, Haddon Hall, Atlantic City, N. J., Nov. 9–12, 1953; Spring Meeting, Edgewater Beach Hotel, Chicago, Mar. 8–11, 1954.

Wisconsin Utilities Association
Electric and Gas Section Convention, Schroeder Hotel, Milwaukee, Nov. 11–13.

***Edison Electric Institute**
Accounting Executive Committee, Edgewater Beach Hotel, Chicago, Nov. 12–13; EEI-AGA General Accounting Committee, Jung Hotel, New Orleans, Nov. 30–Dec. 1, 1953; Commercial Lighting Committee, Detroit, Mich., Dec. 2–3; EEI-AGA Customer Accounting Committee, Netherlands Plaza Hotel, Cincinnati, Ohio, Dec. 3–4; Financing and Investor Relations Committee, EEI Headquarters, New York, Dec. 9; Commercial Cooking and Water Heating Committee, Tutwiler Hotel, Birmingham, Ala., Dec. 10-11; EEI-AGA Accounting Employer Relations, Hotel Cleveland, Cleveland, Ohio, Dec. 14; Commercial Electrical Space Heating and Air Conditioning Committee, Canton, Ohio, Dec. 17-18; Industrial Relations Committee, EEI Headquarters, New York, Dec. 17, 1953; Industrial Relations Committee Joint Meeting with Personnel Administration Section, Southeastern Electric Exchange and Southwestern Personnel Group, Hotel Roosevelt, New Orleans, La., Jan. 21–22, 1954; Transmission and Distribution Committee, Hotel Cleveland, Cleveland, Ohio, Feb. 9-10, 1954; Electrical Equipment Committee, Sheraton Cadillac Hotel, Detroit, Mich., Feb. 15–16, 1954; Industrial Relations Committee, EEI Headquarters, New York, March 18, 1954; Sales Meeting, Edgewater Beach Hotel, Chicago, April 5–8; Annual Meeting, Atlantic City, N. J., June 1–3, 1954.

Institute of Radio Engineers
Annual meeting of Professional group on Vehicular Communications, Somerset Hotel, Boston, Nov. 12-13.

***Pacific Coast Electrical Association**
Administrative Services Section, Hollywood Roosevelt Hotel, Hollywood, Calif., Nov. 12-13; Annual Hawaiian Conference, Honolulu, T. H., Nov. 19-20.

New Jersey Utilities Association
Annual meeting, Seaview Country Club, Absecon, N. J., Nov. 19-20.

***Southeastern Electric Exchange**
General Sales Conference, Atlanta Biltmore Hotel, Atlanta, Ga., Nov. 19-21; 21st Annual Meeting, Boca Raton Hotel, Boca Raton, Fla., March 22-24, 1954.

***Public Utilities Advertising Association**
Region 8 Meeting, Amarillo, Tex., Nov. 23-24; Region Two, Annual Meeting, Skytop, Pa., Dec. 10-11; Region 5 Meeting, Atlanta, Ga., Feb. 11-12; Region 1 Meeting, Montreal, Que., Feb. 25-26.

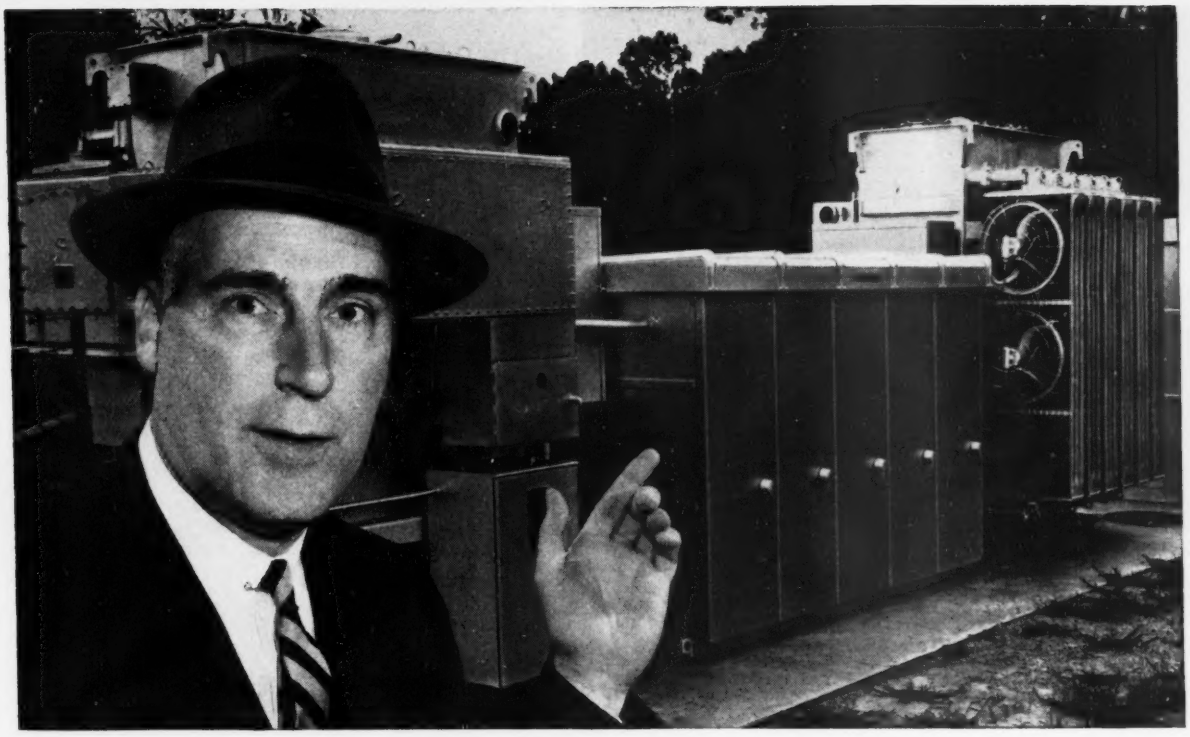
***American Society of Mechanical Engineers**
Annual Meeting, Statler Hotel, New York, Nov. 29-Dec. 4, 1953; Semi-Annual Meeting, William Penn Hotel, Pittsburgh, June 20-24, 1954.

***American Institute of Electrical Engineers**
General Meeting, Statler Hotel, New York City, Jan. 18-22, 1954; Northeastern District Meeting, Schenectady, N. Y., May 5-7, 1954; Summer General and Pacific General Meeting, Hotel Biltmore, Los Angeles, June 21-25, 1954.

***Electrical Equipment Representatives Association**
Winter Annual Meeting, Biltmore Hotel, Los Angeles, Feb. 8-11, 1954.

***American Power Conference**
Sherman Hotel, Chicago, March 24-26, 1954.

***Addition this week.**



Westinghouse Unit Substations make planning for load growth more practical

Wally Payne, Manager of Unit Equipment Sales, tells how two utilities used Westinghouse Unit Substations to solve a vital problem—load growth. They needed equipment that would meet today's needs *economically* and still provide for future expansion. In each case the great flexibility of Westinghouse Unit Substations helped provide the answer. Here's how they did it.

A leading southern utility serves a city's downtown section with secondary networks. A nearby fringe area was growing rapidly, but didn't warrant an underground secondary network—yet. So they installed unit substations in an overhead primary network. Result: flexible capacity for a growing load. As the secondary network is expanded, capacity for the primary network is released to pick up load growth in other areas. The primary network substations can be easily modified to serve adjacent areas.

An eastern utility was growing fast. Westinghouse Unit Substations were selected to serve a network in a heavily loaded urban area. Outlying sections are served by single-feeder unit substations—the Westinghouse CSP® Power Transformer. The 2000-kva unit matched their feeder capacity. As an area grows, another CSP Power Transformer is installed, easily and efficiently.

This company also found that Westinghouse Unit Substations cost less to install, take less space, are easier to relocate if loads shift, and cut down on zoning problems.

If you are planning a system expansion, be sure to call in your Westinghouse Representative. He'll show you how Westinghouse standard components can be tailored into a substation that will solve your particular distribution problem. Meanwhile, write for B-4061, Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

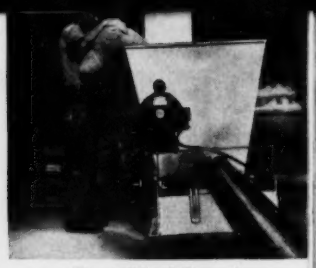
J-60814-A

YOU CAN BE SURE...IF IT'S Westinghouse

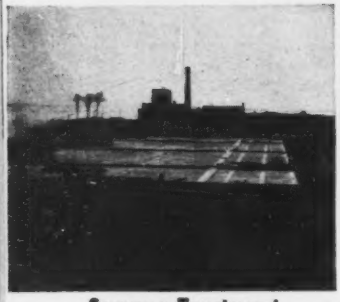
Urban Transit

Outdoor Recreation

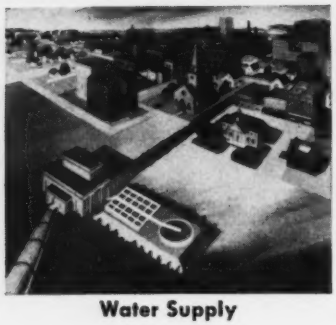
Barn Hay Curing



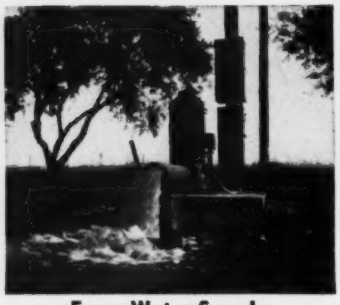
Electrified Farming



Sewage Treatment



Water Supply



Farm Water Supply

Farm Welding

21 dramatic film programs to help you build load, get community action

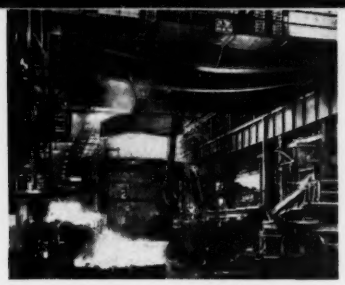
LATEST ELECTRICAL IDEAS and techniques are dramatically portrayed in the twenty-one film programs shown here. You can use them to build industrial and farm electrification, promote community improvement.

General Electric's "More Power to America" film library is a special series of programs designed to help you increase industrial and farm electrification, promote community improvement, and to stimulate your own public-relations activities. Each of these programs contains an educational motion picture or slidefilm, an authoritative manual, and supplementary literature. Specifically designed for use by the electric utilities, these packaged programs represent the best co-operative thinking of electrical and machinery manufacturers, application and consulting engineers. Non-commercial in nature, these film programs dramatically portray the latest electrical ideas and techniques in the use of electrical power in fields ranging from Materials Handling to Sewage Treatment.

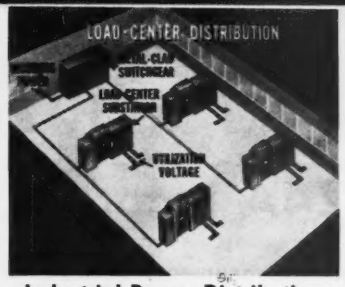
The nation's leading utilities and other organizations are now using over 2000 "More Power to America" programs as vital components of their power sales and community development activities. Utilities of all sizes are placing increasing emphasis on MPA's creative, mass-selling methods. If you would like full details and prices of these film programs—or if you would first like a preview—contact your local G-E Apparatus Sales Office, or mail the coupon to General Electric Co., Schenectady 5, N. Y.

More Power to America

Resistance Welding



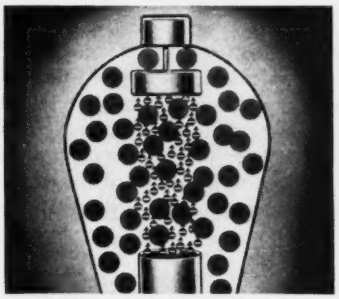
Materials Handling



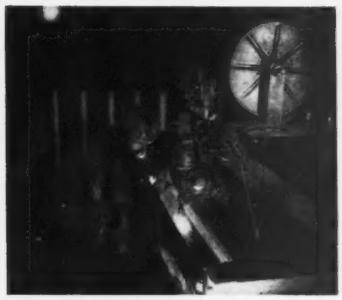
Industrial Power Distribution

Laundry Electrification

Textiles



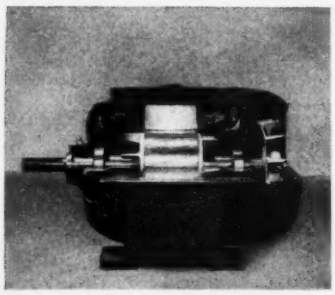
Electronic Training Course



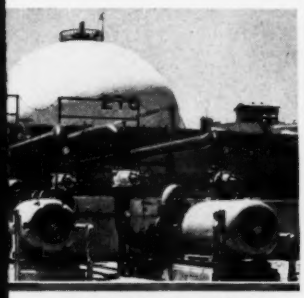
Electric Arc Welding

SEND IN COUPON BELOW

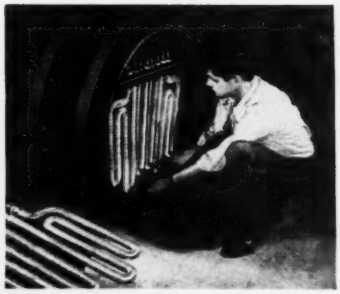
Progressive Mechanization



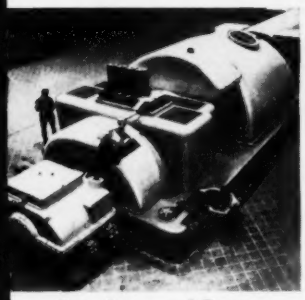
Motor Selection & Application



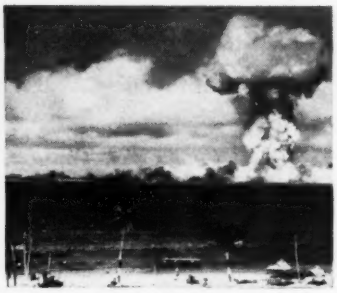
Oil Field Electrification



Industrial Heating



Freedom and Power



Atomic Power

GENERAL ELECTRIC COMPANY
APPARATUS SALES DIV., SEC. B684-3
SCHENECTADY 5, N. Y.

I am interested in the following film programs:

√ **for details and prices** × **on a loan basis**

- ☐ Sewage Treatment (25-minute, 16-mm sound-color motion picture) (GEA-4938-5A)
- ☐ Outdoor Recreation (20-minute, 16-mm, sound, black-and-white motion picture) (GEA-4938-15)
- ☐ Water Supply (25-minute, 16-mm, sound-color motion picture) (GEA-4938-17)
- ☐ Urban Transit (17-minute, 16-mm, sound-color motion picture) (GEA-4938-20)
- ☐ Barn Hay Curing (28-minute, 16-mm, sound-color motion picture) (GEA-5074-1A)
- ☐ Farm Welding (25-minute, 16-mm, sound-color motion picture) (GEA-5074-2)
- ☐ Farm Water Supply (20-minute, 16-mm, sound-color motion picture) (GEA-5074-3)
- ☐ Electrified Farming (20-minute, 16-mm, sound-color motion picture) (GEA-5074-5)
- ☐ Laundry Electrification (30-minute, 35-mm, black-and-white sound slidefilm) GEA-4938-1A)
- ☐ Electronics Training Course (Twelve 20–30-minute, 35-mm, black-and-white sound slidefilm) (GEA-4938-3B)
- ☐ Resistance Welding (30-minute, 16-mm, sound-color motion picture) (GEA-4933-6A)
- ☐ Power Distribution (20-minute, 35-mm,sound-color slidefilm) (GEA-4938-8B)
- ☐ Oil Field Electrification (30-minute, 16-mm, sound-color motion picture (GEA-4938-9A)
- ☐ Materials Handling (24-minute, 16-mm, black-and-white sound motion picture) (GEA-4938-10A)
- ☐ Electric Arc Welding (27-minute, 16-mm, sound-color motion picture) (GEA-4938-11)
- ☐ Textiles (26-minute, 16-mm, sound-color motion picture) (GEA-4938-13)
- ☐ Industrial Heating (30-minute, 35-mm, black-and-white sound slidefilm) (GEA-4938-14)
- ☐ Motor Selection and Application (Ten 10–30-minute, 35-mm, black-and-white sound slidefilm) (GEA-4938-16A)
- ☐ Progressive Mechanization (27-minute, 16-mm, sound-color motion picture) (GEA-4938-18)
- ☐ Freedom and Power (29-minute, 16-mm, sound-color motion picture) (GEA-4938-19)
- ☐ Atomic Power (15-minute, 16-mm, sound-color motion picture) (GEA-4938-22)

NAME .....

TITLE .....

COMPANY .....

ADDRESS .....

CITY ..... STATE .....

GENERAL ELECTRIC

Section 124A Ignored . . .

. . . by some utility managements because of the confusion over the accounting treatment of accelerated amortization

Confusion over the accounting treatment of accelerated amortization of emergency facilities is causing management of some companies not to exercise their rights under Section 124A of the internal revenue code. This is because of the differences in orders issued by state regulatory commissions and the rule proposed by the Federal Power Commission.

Harold H. Scaff, vice president of Ebasco Services, Inc, told members of the Southeastern Electric Exchange at the accounting conference held in Asheville, N. C., recently, that while confusion exists because of the differences in accounting procedure the treatment of accelerated amortization in rate making is of far greater importance and should be of more concern.

Advantages May Be Nullified . . . While there are some benefits which can accrue to a utility using accelerated amortization there is danger that state regulatory commissions might nullify these advantages by circumventing the will of the Congress.

The Ebasco vice president pointed out that despite the confusion that exists with respect to the accounting aspects, the record is abundantly clear that the utility industry is entitled to the same benefits that other industries are receiving from accelerated amortization. He stated that the real benefits are those which arise solely from the deferment of the payment of federal taxes.

H. A. Bush, vice president and treasurer of the General Public Utilities Corp, told the same conference that the privately owned electric utilities will sell about $2 billion of securities this year and about the same in 1954, with about 75% in bonds and preferred stock. Sales of common stock will run about $500 million.

While it is less expensive to sell senior securities to institutional investors yet the utility industry must look to direct sales to the public for much of the funds raised from the sale of common stock, Bush indicated.

Rights Offerings Total $1.2 billion . . . From 1949 to date, the electric companies have offered approximately $1.2 billion of common stock through rights offerings to stockholders. More than 90% of the total was subscribed by stockholders or their assignees. Bush said that while a decline in business may affect the supply of money available for investment by some, there will be others who will have funds for investment purposes.

Of especial interest to the accounting departments of utilities is the idea of penny-less accounting, with variations which can save upwards of 50% in certain procedures. The system does not eliminate cents in recording customer accounts and the like but does take into consideration the many reports and consolidations in which

Iowa PS Adds Its 10,000th Stockholder

Mark Pendleton, left, vice president and treasurer of the Iowa Public Service Co, is greeting Mr and Mrs Lloyd B. Darling, Cherokee, Iowa, farmers, as they start on the first leg of a 500-mile tour of company's installations. The tour lasted for three days and was staged by the company when the Darlings became the 10,000th stockholder.

Asked how he came to buy utility stocks, Mr Darling said: "We had some idle funds that we wanted to put to work. I knew Iowa Public Service was in good hands and growing. So, looking at it from all angles, I just felt it would be a good investment."

the dollar figure is brought to the even number.

Arthur L. Clark, assistant treasurer of the Virginia Electric & Power Co, pointed out that his company has effected surprising savings in clerical cost and time in recording bookkeeping transactions from 30% upwards to 50%. He wondered why more attention had not been paid to this system since the steel companies, and others, had been using it since the 1920's.

He said that his experience had been that what had appeared to be objectionable features at the outset either failed to materialize or just did not exist.

FINANCIAL BRIEFS

Shawinigan Water & Power Co employees are buying company's common stock at 15% below its current stock exchange price under a stock purchase plan. Each employee will be eligible to buy a minimum of five shares. It is based on a maximum of one share per $100 of annual salary. The top number of shares that can be purchased by one employee is 200. Plan applies only to employees over 21 who have been with the company over three years.

Public Service Co of Indiana has increased its quarterly common stock dividend from 45¢ a share to 50¢ a share . . . **Missouri Utilities Co** has hiked its quarterly common stock dividend from 25¢ a share to 28¢.

Michigan Gas & Electric Co is selling its Upper Peninsula facilities to the Upper Peninsula Power Co for a base price of $1,450,000. Michigan G&E's Chairman Richard L. Rosenthal said the sale, still being negotiated, is subject to approval by the Michigan Public Service Commission. The sale is contingent upon the successful completion by Upper Peninsula Power of related acquisitions in the area including the purchase of all of the transmission and distribution facilities of Cliffs Power & Light Co, the formation of a generating company in the area by Upper Peninsula and Cliffs Power & Light Co, the financing of the projects by Upper Peninsula, and the issuance of requisite orders of the PSC approving the transactions.

Today in Utility Finance

YIELDS (%)

Quality	Bonds			Preferred Stocks			Common Stocks		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
DATE									
1953									
Oct. 29	**3.07**	**3.12**	**3.35**	**4.18**	**4.37**	**4.64**	**5.18**	**5.73**	**5.77**
Oct. 22	3.14	3.17	3.41	4.20	4.38	4.68	5.17	5.68	5.81
END OF QTR									
3rd 1953	3.30	3.33	3.54	4.35	4.52	4.83	5.36	5.97	6.01
2nd 1953	3.34	3.46	3.64	4.47	4.70	4.88	5.52	5.93	6.10
1st 1953	3.15	3.23	3.39	4.16	4.41	4.66	4.95	5.24	5.50
4th 1952	2.99	3.03	3.14	4.06	4.22	4.59	4.98	5.33	5.62

Data: Reis & Chandler, Inc.

EARNINGS

Company	Period Months Ended		Net Income 1953	Net Income 1952	Earnings Per Common Share 1953	Earnings Per Common Share 1952
Arizona Public Service	12	Sept.	$3,659,000	$3,177,000	$....	$....
Central Illinois Electric & Gas	12	Sept.	1,895,017	1,903,295	2.29	2.30
Consolidated Edison Co of New York, consolidated	12	Sept.	50,484,992	43,313,353	3.01(a)	2.51(a)
Dallas Power & Light	12	Sept.	5,038,247	3,852,719	....	....
Gulf States Utilities	12	Sept.	8,569,908	6,953,082	1.67(b)	1.44(b)
Iowa Southern Utilities	12	Sept.	1,385,245	970,145	1.98(c)	1.39(c)
Kansas City Power & Light	12	Sept.	6,449,597	5,672,089	....	....
Kentucky Utilities, consolidated	12	Sept.	4,842,768	4,424,262	....	....
Long Island Lighting	12	Sept.	7,168,326	6,053,347	1.24(e)	1.31(e)
Middle South Utilities, consolidated	12	Sept.	15,085,514	13,232,044	1.99(f)	1.96(f)
Public Service of New Mexico	12	Sept.	1,197,664	989,718	.81	.71
Public Service of Oklahoma	12	Sept.	5,400,748	4,874,257	....	....
Shawinigan Water & Power	9	Sept.	4,242,796	3,816,542	1.59	1.39
Southwestern Gas & Electric	12	Sept.	4,087,698	3,721,927	....	....
Texas Electric Service	12	Sept.	8,822,550	8,066,111	....	....
Texas Power & Light	12	Sept.	8,907,162	7,145,239	....	....
Tucson Gas, Electric Light & Power	12	Sept.	1,554,589	1,226,285	2.81	2.30
Virginia Electric & Power	12	Sept.	12,610,868	11,453,805	1.90	1.69

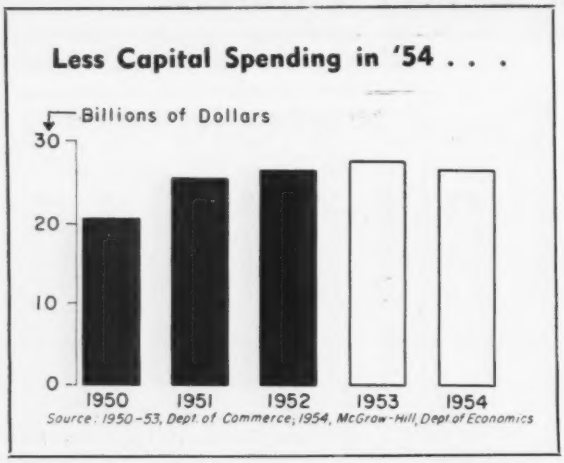
Notes—(a) Based on 13,607,203 shares in 1953 and 13,452,635 shares in 1952; (b) Based on 4,221,832 shares in 1953 and 3,905,210 shares in 1952; (c) Based on 627,547 shares in 1953 and 577,441 shares in 1952; (e) Based on average number of shares outstanding; and (f) Based on 6,847,917 shares in 1953 and 6,350,000 shares in 1952 and excluding tax reduction due to Amortization of Emergency Facilities.

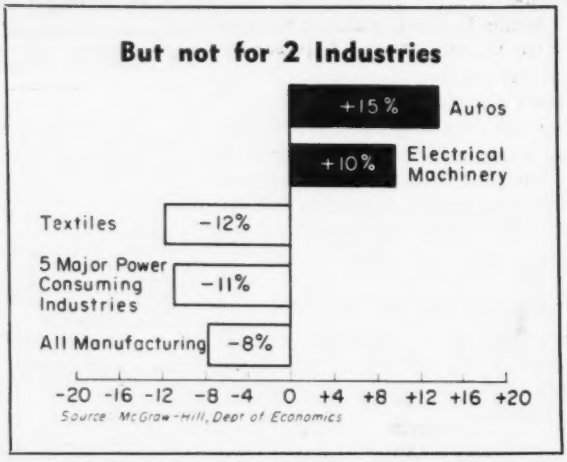
FINANCING

Company and Description	Amount of Offering (000)	Offering Price	Yield to Public
WEEK OF OCTOBER 29—NOVEMBER 4			
None.			
SCHEDULE FOR NOVEMBER—DECEMBER—JANUARY			
Bonds			**Bid Date**
Long Island Lighting—1st mtg due 1983	$25,000	.....	Nov. 9
Gulf States Utilities—1st mtg due 1983	10,000	.....	Nov. 23
Monongahela Power—1st mtg due 1983	10,000	.....	Dec. 1
Columbus & Southern Ohio Electric—1st mtg due 1983	10,000	.....	Dec. 11
Ohio Edison—1st mtg due 1984	30,000	.....	Jan. 19
Iowa Power & Light—1st mtg due 1983	8,500	.....	.....
Illinois Power—1st mtg due 1983	20,000	.....	.....
Preferred Stock			
Worcester County Electric—75,000 sh $100 par	$7,500	.....	Nov. 17
Duquesne Light—100,000 sh $50 par	5,000	.....	.....
Iowa Power & Light—50,000 sh $100 par cum	5,000(a)	.....	.....
Common Stock			
Delaware Power & Light—232,520 sh (to be offered common holders on a 1-for-7 basis, record Nov. 25 to expire Dec. 15; employees to be given right to subscribe up to 150 shares)	.....	.....	.....
Virginia Electric Power—558,946 sh	.....	.....	.....
Columbus & Southern Ohio Electric—200,000 sh (b)	.....	.....	.....
Ohio Edison—527,830 sh (to be offered commonholders on 1-for-10 basis, record Jan. 11)	.....	.....	.....
POSTPONED, UNSCHEDULED, AND/OR UNDER CONSIDERATION			
Bonds			
Southwestern Public Service—1st mtg	$12,000(e)	.....	.....
Florida Power Corp—1st mtg	10,000(e)	.....	.....
Houston Lighting & Power—1st mtg	25,000	.....	.....
Public Service Co of Colorado—1st mtg	15,000	.....	.....
Brazos River Authority, Tex.—electric revenues	66,000	.....	.....
Preferred Stock			
Southwestern Public Service	$3,000(e)	.....	.....
Narragansett Electric—150,000 sh $50 par	7,500	.....	.....
Common Stock			
Iowa-Illinois Electric & Gas	$6,000(f)	.....	.....
Southwestern Public Service—(to be offered on about a 1-for-13 basis)	.....	.....	.....
Arizona Public Service—240,000 sh	.....	.....	.....

Notes—(a) Company has asked FPC to exempt the issue from competitive bidding requirements; (b) To be offered by an investment group headed by Dillon, Read & Co; (e) Estimated; and (f) To sell enough common stock to yield $6 million.

ELECTRICAL BUSINESS OUTLOOK




But not for 2 Industries
+15% Autos
+10% Electrical Machinery
Textiles -12%
5 Major Power Consuming Industries -11%
All Manufacturing -8%
-20 -16 -12 -8 -4 0 +4 +8 +12 +16 +20
Source: McGraw-Hill, Dept. of Economics

Plant Expansion to Stay at High Level in '54

Business spending for new plant and equipment will stay high in 1954 if present indications are borne out. The latest sign of high capital investment comes from manufacturers. They plan to invest just about 8% less in 1954 than in 1953, according to a survey by the McGraw-Hill Department of Economics. In addition, electric and gas utilities and mining companies plan to invest just about as much next year as this year. Manufacturing, mining, and the utilities generally account for about one half of total business capital investment.

Taken together with a reasonable estimate of investment in other industries, these plans are a bright spot in the business outlook for the next year. If they are all carried out, they mean another year of high production in the industries producing capital goods. And these have been key industries behind the prosperity of recent years.

Investment For Years Has Been Tremendous . . . Manufacturers' plans are surprisingly large, considering the tremendous investment they have made in new plant and equipment since the war. Even with a drop in 1954, manufacturing capital investment will be near the highest levels on record.

Furthermore, there is no evidence that fear of a recession has led to cuts in investment planning. Most of the decline in plans is in industries that have just about completed a big defense expansion. Some companies—especially the larger ones—are actually planning to increase capital spending next year.

Greater emphasis will be placed on machinery. This means that potential growth in industrial power demand will hold up better than the overall figures on capital investment. After all, it's the machines—and not the empty shell of a building—that use the power.

Manufacturers' investment plans vary sharply between different industries (chart). Steel shows the largest drop—24%—compared with 1953. That industry has just about met its defense expansion goals for new capacity. But the industry still plans to spend more than $1 billion next year on modernizing existing plants and developing new sources of iron ore.

Automobiles show the largest increase in plans. The auto industry is now in the middle of a competitive struggle. So the industry is spending heavily to get ready to turn out new models full of attractive features for the consumer.

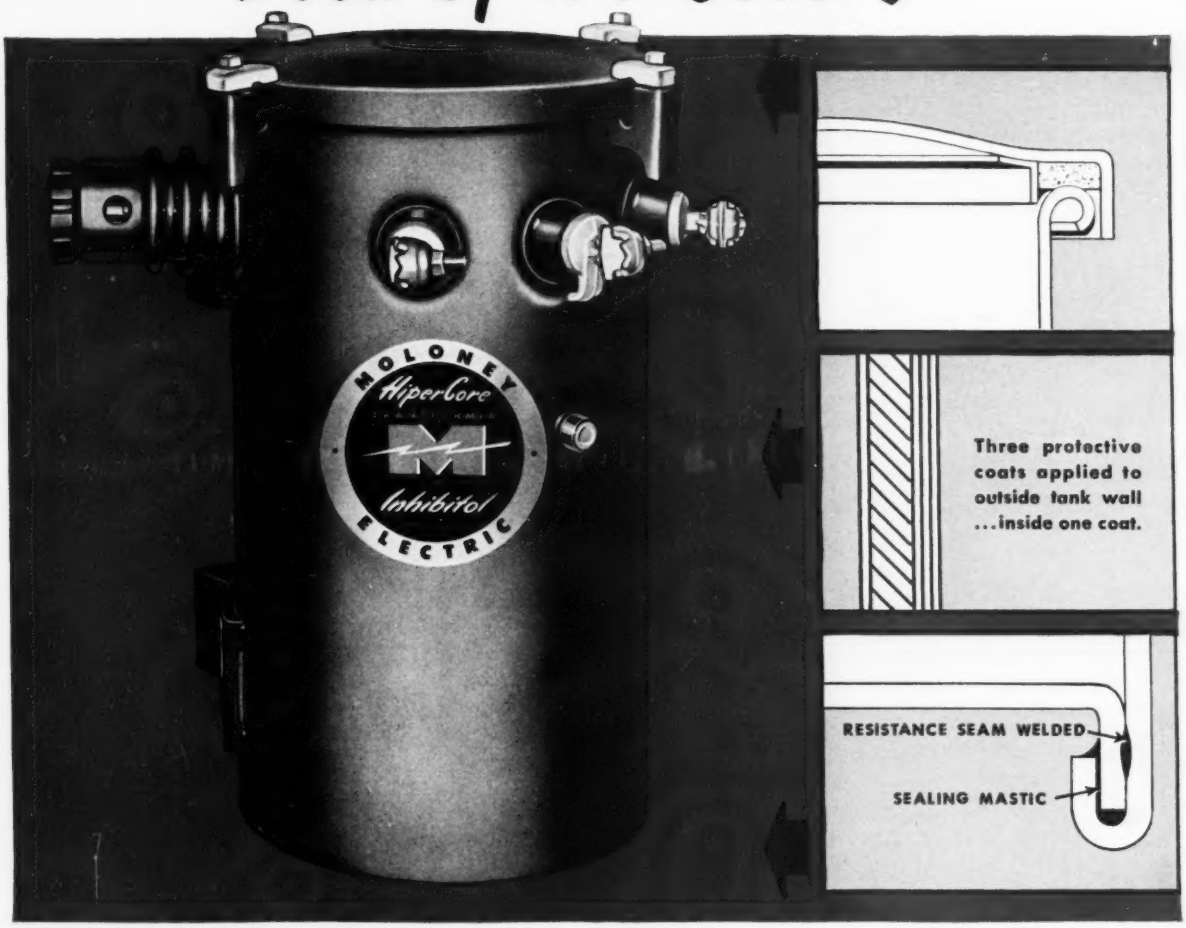
More Machinery For New Growth Products . . . The electrical machinery industry is expanding to produce its multitude of new growth products. Companies making non-electrical machinery, on the other hand, face varying trends. Some—like office machinery—want to spend more. Others, including farm and construction machinery, expect to spend less.

Five major power consuming industries will be down a bit more than the average for all manufacturing, if present plans are completed. These industries include petroleum and coal products, chemicals, paper and pulp, non-ferrous metals, and steel. They have all had big expansions in the past three years, and plan to invest about 11% less as a group next year than in 1953.

However, the drop is by no means spread evenly among these industries. Probably as much money—maybe more—will be spent on oil refineries in 1954 as in 1953. Paper industries also plan to spend more.

All these plans are still tentative. They can be changed if industry wants to change them. As an illustration: McGraw-Hill first asked industry for its 1954 investment plans back in February. Since then some chemical companies have cut their plans sharply because sales did not meet expectations. On the other hand steel has sharply increased its plans. A major shift in the economic situation could bring a lot more of these changes.

Who says you can't tell a Book by it's Cover?



The tank covers of Moloney HiperCore Transformers tell eloquent stories of dependability and long life . . . the mark of Moloney for over fifty years. Top, bottom, and all around, the design and careful fabrication of these seam-welded tanks is better... they're built to take plenty of punishment and deliver long years of trouble-free service.

Check the critical points of greatest wear and see how Moloney offers more. HiperCore Transformer tanks are pressure sealed to keep out moisture, and prevent the entrance of deteriorating agents harmful to the oil. Cover gaskets are retained and compressed for an absolute super-sure seal, and are reuseable. Bottoms are pressed in, seam-welded and rolled to a triple thickness to combine the reliability of a weld and the ruggedness of a roll. And, too, the tank receives protective coats of durable alkyd melamine paint, especially noted for its ability to withstand extreme weather conditions. This surface resists scuffing and scratching, provides longer life.

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ME53-30

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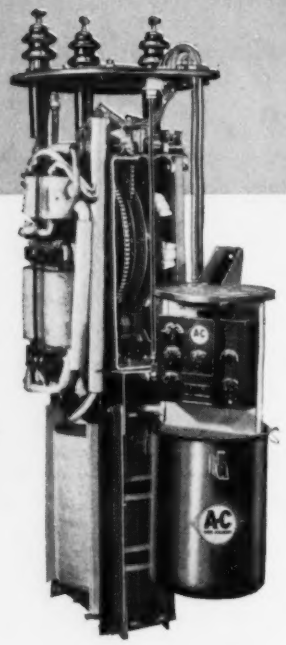
SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS, MO. AND TORONTO, ONT., CANADA

KEY TO Low Operating Costs



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And it's unit construction that cuts inspection and service costs on your system. Untanking is fast and easy because transformer, mechanism, and control are all cover-suspended. Just remove the cover bolts and handhole cover; then the unit can be quickly untanked. And since there are no electrical connections to break, you can operate the regulator outside the tank merely by connecting a separate electrical source to the control.

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